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Europe and Central Eurasia

Volume III

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Foreword

This edition of the U.S. Geological Survey (USGS) Minerals Yearbook discusses the performance of the worldwide minerals and materials industries during 2000 and provides background information to assist in interpreting that performance. Content of the individual Minerals Yearbook volumes follows:

- Volume I, Metals and Minerals, contains chapters about virtually all metallic and industrial mineral commodities important to the U.S. economy. Chapters on survey methods, summary statistics for domestic nonfuel minerals, and trends in mining and quarrying in the metals and industrial minerals industries in the United States are also included.
- Volume II, Area Reports: Domestic, contains a chapter on the mineral industry of each of the 50 States and Puerto Rico and the Administered Islands. This volume also has chapters on survey methods and summary statistics for domestic nonfuel minerals.
- Volume III, Area Reports: International, is published as four separate reports. These regional reports contain the latest available minerals data on more than 190 foreign countries and discuss the importance of minerals to the economies of these nations and the United States. Each report begins with an overview of the region's mineral industries during the year. It continues with individual country chapters that examine the mining, refining, processing, and use of minerals in each country of the region and how each country's mineral industry relates to U.S. industry. Most chapters include production tables and industry structure tables, information about Government policies and programs that affect the country's minerals industry, and an outlook section.

The USGS continually strives to improve the value of its publications to users. Constructive comments and suggestions by readers of the Minerals Yearbook are welcomed.

Charles G. Groat, Director

Contacts

Information about the U.S. Geological Survey, its programs, staff, and products may be accessed on the World Wide Web at URL http://www.usgs.gov/ by contacting the Earth Science Information Center at 1-888-ASK-MAPS. For specific information about this publication, contact the Chief, International Minerals Section, Minerals Information Team, at (703) 648-7732 or the Chief, Publication Services Section, Minerals Information Team at (703) 648-7790. Additional minerals information may be accessed on the World Wide Web at http://minerals.usgs.gov/minerals/.

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The Country Specialists, in the Minerals Information Team, U.S. Geological Survey, in preparing the International Review regional books of Volume III of the Minerals Yearbook, extensively use statistics and data on mineral production, consumption, and trade provided by various foreign government minerals and statistical agencies through various official publications. The cooperation and assistance of these organizations are gratefully acknowledged. Statistical and informational material was also obtained from reports of the U.S. Department of State, United Nations publications, and the domestic and foreign technical and trade press. Of particular assistance were reports submitted by the Resource Reporting Officers and other officials of the Department of State in U.S. Embassies worldwide. Their contributions are sincerely appreciated. Internal statistical support was provided by the staff of the Data Collection and Coordination Section of the Minerals Information Team.

The regimes of some countries reviewed in this volume may not be recognized by the U.S. Government. The information contained herein is technical and statistical in nature and is not to be construed as conflicting with or being contradictory of U.S. foreign policy.

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THE MINERAL INDUSTRIES OF

EUROPE AND CENTRAL EURASIA

By Chin S. Kuo, Richard M. Levine, Harold R. Newman, Walter G. Steblez, Glenn J. Wallace, and David R. Wilburn

As a subset of the Eurasian landmass, the region of Europe and Central Eurasia encompasses continental territory that extends from the Atlantic coast of Europe to the Pacific coast of Russia and includes Iceland, Ireland, and the United Kingdom. Greenland in the northwest Atlantic Ocean and Sakhalin and Kurile Islands in the Pacific Ocean, off the Sea of Japan, which are political extensions of Denmark and Russia, respectively, also are included in this volume.

The post-cold-war (1990-2000) European and Central Eurasian environment included new political and economic configurations and trends. In the countries of Central Europe (Czech Republic, Hungary, Slovakia, and Poland), the Balkans (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Serbia and Montenegro, and Slovenia, excluding Greece) and Central Eurasia [comprising the Commonwealth of Independent States (CIS) (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan, and Ukraine)] and the Baltic Sea area countries (Estonia, Latvia, and Lithuania), central economic planning was replaced with processes of transition to more open political systems and market-based economies.

The CIS was founded initially in 1991 by several republics of the former Soviet Union (FSU) to promote free economic space in the FSU region; however, it does not have supranational powers, and its member countries have equal standing in international law. The Central European Free Trade Agreement (CEFTA) was founded on December 21, 1992, by Czechoslovakia [now (2000) the Czech Republic and Slovakia], Hungary, and Poland. The chief purpose of CEFTA was to harmonize all spheres of economic relations among the member countries in conformity with standards and principles promulgated by the General Agreement on Tariffs and Trade and the World Trade Organization. CEFTA also was viewed by its members as a necessary first step toward ultimate accommodation within Western European political and economic structures. Slovenia, Romania, and Bulgaria joined CEFTA in 1996, 1997, and 1999, respectively.

Economic integration in Western Europe had evolved into the formation of the European Union (EU), a supranational entity comprising Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. The admission of new member countries (including those of CEFTA) as well other countries in the region was one of the significant political questions facing the leadership of the EU.

In 2000, the EU opened accession negotiations with seven countries—Bulgaria, Latvia, Lithuania, Malta, Romania, Slovakia, and Turkey. The EU already had been negotiating formally with six other countries—Cyprus, the Czech Republic, Estonia, Hungary, Poland, and Slovenia; although no entry date had been set, membership was expected to be extended to these six countries by about 2005. This enlargement would represent the single largest EU enlargement. The last enlargement was in 1995 when Austria, Finland, and Sweden acceded. Candidate countries face large challenges. New member countries must fulfill such political and economic criteria as achieving stability of institutions guaranteeing democracy, the rule of law, human rights, and respect for and protection of minorities. They must have a functioning market economy, which would include the capacity to cope with competitive pressure and market forces within the EU, and be able to take on such membership obligations as accommodation with the EU's political and economic policies, which would include monetary union.

These and other issues have made the integration of even the more transitionally advanced formerly centrally planned countries slow and contingent on structural conformity with EU norms. Because of the very different paths of development that Western Europe, on the one hand, and Central Eurasia and Central Europe and the Balkans, on the other, followed after the Second World War, an economic asymmetry between these two areas emerged and remained throughout the post-cold-war period of the 1990s. This asymmetry framed the initial commercial relationship in the minerals sphere between the two areas. Western Europe imported raw materials from, toll-smelted raw materials in, sold equipment and technology to, and invested in the mineral development projects in the formerly centrally planned economy countries, largely without reciprocal activities on the part of the latter.

Economic Conditions and Issues

Europe and Central Eurasia play a substantial role in the world mineral economy, occupying an important place at both poles within that economy as a supplier and consumer of all major mineral commodity groups. In 2000, Western Europe continued to be a major world processor, fabricator, and consumer of minerals, whereas the role of Central Eurasia remained that of a major world supplier of minerals. Central Europe and the Balkans, however, played a much lesser role with respect to the supply and disposition of most mineral commodities.

Western Europe, with a population exceeding 300 million, had one of the most advanced regional economies in the world, whose collective value in 2000, measured in terms of gross domestic product (GDP), amounted to more than $8.5 trillion, or about 88% that of the United States, and a per capita GDP averaging more than $22,000, which also was about 88% that of the United States (table 1). In 2000, the average growth rate of the GDP in Western Europe was about 3.9%, compared with about 5% growth in the U.S. economy.

On January 1, 1999, the EU adopted the euro (€) as its new single currency for the member states that had met the macroeconomic conditions necessary to join the European Monetary Union (EMU). Although euro banknotes and coins will not enter into circulation until January 2002, the euro is already being used in electronic transactions and as a unit of account whose value has been fixed irrevocably with the participating member states currencies. The first countries to use the euro will be Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. As of yearend 2000, Denmark, Sweden, and the United Kingdom had not yet entered into the EMU agreement.

As a major world mineral processing and consuming subregion, Western Europe consequently remained a major determinant of world demand for all mineral commodities. With the exhaustion of its mineral reserves and a decline in its role as a world mine producer of minerals, Western Europe continued to be a major producer of copper, iron, lead, and zinc metals based largely on imported raw materials; its mineral processing and manufacturing industries also accounted for a significant share of world production of semimanufacured and fabricated ferrous and nonferrous metals (see table 3). Western Europe, however, played a significant role in the world in the extraction and processing of certain industrial minerals and mineral fuels. Significant petroleum and natural gas resources had been developed in the North Sea, and there were also adequate coal reserves. Germany remained Western Europe's dominant smelter and refiner of most metals and mine producer of a number of industrial minerals and coal.

In 2000, coal subsidies and overcapacity and trade sanctions that have affected the steel industry were some of the major economic issues that concerned the EU. Total coal production in the EU declined to about 328 million metric tons (Mt) in 2000 from 336 Mt in 1999. There was a sharp decline in hard coal (anthracite and bituminous) production to 85 Mt in 2000 from 98 Mt in 1999. The output of hard coal was seriously affected by efforts to reduce dependence on subsidies. Brown coal and lignite production, however, was not subsidized in most of the major producing EU countries.

The European Commission (EC) has called for the closure or suspension of production at coal mines in the EU that performed poorly, despite being granted state aid, with a view to their being restructured and made profitable. The EC has criticized aid paid by member governments to the coal industry, which it claims "is in crisis, despite several years of state aid." The inefficiency and lack of competitiveness in the coal sector not only had not been corrected but in many cases was exacerbated. The EC calculated that in 2000, state aid paid each coal-industry worker $54,000 in Germany, $46,000 in France, and just over $36,000 in Spain. A majority of miners in the EU have spent their entire working career employed by continuously state-supported operations.

Given that the security of energy supply was viewed as an economic priority, the EC recognized the need to guarantee quick and easy access to solid fuels. However, the EC also recognized that this priority should not be used as an argument to continue uneconomic coal production. There were moves within member states to achieve the aims of the EC. France has settled on 2005 as the last year in which coal mining will take place on its territory. Germany and Spain also sought to accelerate their restructuring plans. The United Kingdom reintroduced aid for coal mining in 2000, which, however, was to be phased out in 2001.

Western Europe's steel industry was among the most consolidated steel industries in the world. Usinor Group [24 million metric tons per year (Mt/yr) capacity], Corus Group (22.9 Mt/yr capacity), Arbed Group (22.4 Mt/yr capacity), Thyssen Krupp Group (18.9 Mt/yr capacity), and Rica Group (14 Mt/yr capacity) account for more than 100 Mt/yr of raw steel capacity, which is about one-half the EU total. Acquisitions and consolidations have had the effect of creating global players without adding to overall capacity. In the privatization process, Finland planned to sell the Government's shares in producers of base metals and stainless steel (Outokumpu Oyi) and steel (Rautaruukki Oyi). Outokumpu and Avesta Sheffield of Sweden merged to create a new company, Avesta Polarit Oyi, that would have a total capacity of 1.7 Mt/yr of stainless steel slab.

A key issue that concerned the EU's steel sector was the prospective addition of significant steel industries of the applicant countries (1999 production, about 33 Mt); their accession would add about 20% to the current [2000] steel production of the 15-member EU. Furthermore, the additional steel industries of the prospective member countries were seen to vary in the degree of their conformity to EU standards of efficiency, ownership, productivity, and environmental attributes, which threatened to become a serious point of disagreement during negotiations on accession. Several EU steel industry groups have issued separate but similar demands for the Central European and Balkan countries to adhere more closely to EU rules. EU steel companies are concerned in particular about the slowness of restructuring and privatizing the steel industries of Central Europe and the Balkans. They allege that deadlines agreed upon with the EU for the adoption of necessary capacity reduction plans have not been met and that many steelworks in Central Europe and the Balkans allegedly are kept alive only through state subsidization, which is illegal in the EU. The steel industry group Eurofer was considering filing countervailing duty cases against steel imports from the Central European and Balkan area unless effective and rapid restructuring efforts were made.

In contrast to Western European countries, the transitional economy countries of Central Eurasia and Central Europe and the Balkans with a combined population exceeding 406 million had a combined GDP amounting to about $2.6 trillion, or about 30% of that of Western Europe and about 26% of that of the United States.

In 2000, within the transitional economy countries, such factors as the growth of per capita income appeared to be more favorable with respect to CEFTA member countries, whose average per capita GDP was almost 2.5 times greater than that of the CIS but whose negative demographic growth was similar to that of the CIS (table1). Compared with Western Europe's low but positive demographic growth (0.28% compared with that of 1999), the population growth rates of Central Europe and the Balkans and Central Eurasia were varied, showing a decrease of 0.21% and an increase of 0.27%, respectively. Most unaffiliated Balkan countries (Albania, Bosnia and Herzegovina, and Croatia) showed positive population growth (table 1). The CIS's average GDP growth rate of more than 6% in 2000 was greater than that in most groupings within Europe and Central Eurasia, reflecting varying combinations of low economic baselines, favorable rises in world prices for hydrocarbons, and their corresponding production increases in such countries as Azerbaijan (11.4%), Kazakhstan (10.5%), Russia (6.3%), and Turkmenistan (16%).

The countries of the CIS collectively had an extensive minerals economy, which accounted for a major share of the world's extraction of fuels, industrial minerals, and metals and the production of processed mineral products, including metals and petroleum refinery products. Although domestic demand for mineral products was reviving in the CIS countries, consumption of most mineral products remained far below the levels that had existed prior to the break-up of the Soviet Union and well below the levels of advanced industrialized countries.

In 2000, the CIS remained a major world producer of mercury (mine output, 26%), primary aluminum (15%), alumina (11%), mined tungsten (9%), and mined and refined copper (8% and 9%, respectively) and of such precious metals as palladium (54%), platinum (19%), gold (10%), and silver (8%). With respect to ferrous metals, the CIS had a significant share of the world output of manganese ore (18%), mined and refined nickel (22% each), chromite (19%), iron ore (15%), and pig iron (12%). The CIS also produced a significant share of the total world production of such selected industrial minerals and fuels as natural gas (33%), potash (30%), uranium (16%), nitrogen (14%), sulfur (14%), crude petroleum (11%), and phosphate rock (10%).

Russia, which covered about 75% of the territory of the CIS, had the largest mineral industry in Europe and Central Eurasia. Russia produced a broad range of crude and processed mineral commodities. Kazakhstan followed Russia as the country in the region that had the most important place in the world mineral economy. Ukraine, Uzbekistan, and several other CIS countries also were important producers and processors of minerals. According to data and estimates available for this report, Russia ranked first in the world in the production of asbestos, natural gas, nickel, palladium, and titanium sponge; second in the world in the production of aluminum, platinum, and potash; and among the top five leading world producers of other mineral commodities, including the mine output of antimony, beryl, boron, cobalt, diamond (gem and industrial grades), gold, iron ore, petroleum, phosphates, sulfur, and tungsten as well as the production of ferroalloys, magnesium metals, and crude steel.

Kazakhstan was a significant producer of such mineral products as arsenic, barite, beryllium metal, bismuth, cadmium, chromite, copper, ferroalloys, lead, titanium sponge, uranium, and zinc. Ukraine was a significant producer of such mineral products as ferroalloys, iron ore, manganese ore, pig iron, crude steel, and titanium ores (ilmenite and rutile). Other CIS countries that were significant world producers of one or more mineral commodities included Azerbaijan (oil), Armenia (molybdenum), Belarus (potash), Kyrgyzstan (antimony metal and mercury ore and metal), Tajikistan (aluminum), Turkmenistan (natural gas), and Uzbekistan (gold and uranium); all CIS countries produced a range of other mineral commodities.

The countries of the Caspian Sea region were of great importance to world energy markets because of the large oil and gas reserves in this region that were beginning to be fully developed. These potential resources have created competition between countries concerning their ownership, among companies to get development rights, and among countries to establish export routes. Proven oil reserves for the entire Caspian Sea region, which amount to between 18 billion and 35 billion barrels (Gbbl), were comparable to those of the United States (22 Gbbl) and greater than those in the North Sea (17 Gbbl); projections of undiscovered petroleum resources indicate 235 Gbbl of oil.

For the Caspian Sea region to be developed to its full oil and gas potential, the littoral states must first agree on the legal status of the Caspian Sea in order to settle the issue of the ownership of resources. No agreed-upon convention exits that delineates the littoral states' ownership of the Caspian Sea's resources or their development rights. Several conflicts have arisen over claims to regions of the Caspian. Disputes exist concerning whether the resources in the Caspian should be shared in common by all littoral states or if the Caspian Sea should be divided into national sectors. Negotiations between the littoral states have made slow progress in resolving differences. Division into national sectors has been the de facto solution, but disputes have arisen over the delineation of these national sectors.

Central Europe and the Balkans, which transect Western Europe and Central Eurasia roughly from the Baltic Sea to the Black Sea and the Mediterranean-Adriatic Sea areas, had economies and mineral industries similar in kind though not in scope to those of Central Eurasia. With the exception of Poland, which remained a major world producer of bituminous coal, copper, salt, silver, and mined sulfur, most countries of Central Europe and the Balkans produced most minerals primarily for domestic or local use. In the Balkan area, before 1991, former Yugoslavia [now (2000) the independent republics of Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Montenegro, and Slovenia] was a major European producer of aluminum, copper, lead, and zinc as well as a broad range of mined and processed metals, industrial minerals, and mineral fuels. Former Yugoslavia also was a major European toll smelter of base metals. The civil war and ethnic strife, which followed the dissolution of former Yugoslavia, left these countries, with the exception of Slovenia, with damaged and ruined industrial plants and infrastructure, and generally depressed economies that greatly diminished investor confidence and interest in them. In 2000, active conflict stemming from ethnic disputes in the region centered in the Serbian province of Kosovo in Serbia and Montenegro as well as in neighboring Macedonia, which threatened to destabilize areas beyond the confines of those countries.

Investment Overview

In Western Europe, despite up-to-date mining legislation, deregulation, and tax relief to encourage investment in mineral resource exploration and development, these activities generally have been decreasing. Apart from exploration activities described later, some investment to reevaluate older mining areas appeared to be forthcoming in 2000.

The need to rationalize and modernize industrial processes to raise their competitiveness and bring them into compliance with environmental standards was one of the chief aims of the economic transition process in Central Europe and the Balkans and Central Eurasia apart from denationalization. Another important aim was the modernization of infrastructure to more efficiently serve social and commercial interests. In Central Europe, these transitional needs presented targets of opportunity for foreign investors. During most of the 1990s and through 2000, strong foreign investor interest in Central Europe was manifested by very high activity in the area's industrial minerals sector, especially its cement plants and associated quarries for calcareous stone, clay, gypsum, and marl. Investment in other branches of the industrial minerals was highlighted by activity in Hungary's kaolinite, perlite, and silica operations.

By 2000, virtually all of Central Europe's cement operations (clinker and grinding) as well as their quarries had been acquired by Western Europe's (mainly EU) leading cement producers and building material manufacturers. The output of these plants not only met the domestic needs of the Central European countries but also was exported, in many cases to the foreign owners' home countries in the EU. In the Balkans, this also was the case, though later, with respect to Bulgaria, Croatia, Macedonia, and Serbia and Montenegro. Albania received further outside investment that privatized almost the entire sector in 2000.

In 2000, foreign investment activity (mostly from the EU) was especially pronounced. Central Europe's iron and steel sector saw facility expansion and modernization at Poland's Sendzimir, Katowice, and Huta Lucchini steel mills as well as at the Czech Republic's Poldi, Trinecke Zelezarny, and Poldi I steelworks. In Slovakia, U.S. Steel of the United States conducted successful negotiations with the Government of Slovakia to purchase the VSZ steel plant.

Foreign investment in base and precious metals in the Balkans involved the acquisition of mine production and processing rights for copper and gold in Albania, Bulgaria, and Romania. Albania also reported outside investment in its chromite mining and ferrochromium producing operations as well as at its steel plant at Elbasan. Foreign capital also was channeled for acquisition and modernization of iron and steel plants in Bosnia and Herzegovina, Bulgaria, Macedonia (including the sale of the ferronickel producer FENI), Romania, and Slovenia.

One of the major investment considerations that has significant economic, environmental, and geopolitical ramifications involves the proposed routing of additional pipelines to export hydrocarbons from Central Eurasia. This host of issues included the degree that Russia should control export routes by having them pass through its territory, the intent of countries to avoid routing pipelines through such potentially unstable countries as Iran and Afghanistan, the role of Armenia as a potential transit route owing to its conflict with Azerbaijan, and the potential environmental hazards of routing shipments by pipeline under the Caspian Sea or by tanker through the Bosporus. Such unresolved issues have obstructed the planning and construction of potential export pipelines from the region. A designated northern route was being used to transport the first oil production (early oil) from Azerbaijan, which transits 129 kilometers (km) (about 80 miles) through the war-torn Russian republic of Chechnya en route to the Black Sea port of Novorosiisk. A western route was also in use for early oil that passed through Georgia to the Black Sea. A major route being considered was the Baku-Ceyhan Pipeline route termed the Main Export Pipeline (MEP). The MEP would extend 1,670 km (about 1,038 miles) through Azerbaijan, Georgia, and Turkey and transport oil from the Caspian littoral states. The three countries on whose territory the pipeline would be built have affirmed their support for the project, but the oil companies that would finance the construction of the pipeline would have to agree on the economic feasibility of this project. In 2000, several studies for various pipeline construction routes that could enhance the delivery of natural gas and petroleum from the CIS to the area were undertaken by a number of Balkan countries.

One of the few instances of investment outside the region by a transitional economy country has been investment and exploration activity since 1997 by KGHM S.A., Poland's copper producer in copper mining properties and deposits in Zambia and the Democratic Republic of the Congo.

Legislation

In contrast to Western Europe, where much of the legislation needed to restrict pollution and to stimulate and regulate general commercial and mineral industry operations was firmly in place, the legislative situation in the transitional economy countries remained more fluid during the 1990s. The legislative agendas of the countries of Central Europe and the Balkans and Central Eurasia focused mainly on reducing social tensions stemming from denationalization of whole economies, while at the same time attempting to bring legal and regulatory practices in the area into greater conformity with those of the developed market economy countries of Western Europe, especially as they relate to environmental standards, private ownership practice, mining law, and foreign investment rules.

Environmental Issues and Trends

Environmental protection continued to be a major issue, especially in the densely populated areas of the region. Environmental laws and regulations and a high degree of their implementation had been to a large extent fully established during the 1980s and 1990s in Western Europe, and most industrial enterprises, including those in the mineral producing and processing sector, were obligated to meet set standards for effluent discharges into the environment. These environmental standards were among the major criteria for accession by new member countries into the EU. The environmental situation in Central Europe and the Balkans and Central Eurasia at the start of their transition to market-based economic systems revealed a landscape of highly polluting heavy industries that in many cases caused serious health concerns to arise in the area. This was not due to an absence or lack of environmental laws in the transitional economy countries, but mainly owing to very little effort expended by the former regimes in these countries to enforce the existing pollution laws and in some cases to correct confusing and sometimes contradictory laws and regulations. Although some evidence pointed to an abatement of discharges of harmful pollutants from the mining and mineral processing sector during the early 1990s, in several Central European and Central Eurasian countries, this largely was the result of a sharp decline in production during that period. More recently, the new applicants for EU membership from these areas have been undertaking serious efforts to make major improvements with respect to the environmental regulatory process and enforcement. Environmental concerns in the Czech Republic and Poland, for example, have led to questions regarding the soundness of developing valuable new gold and lead-zinc deposits.

Exploration

Minerals exploration in Europe and Central Eurasia in 2000 appeared to be following the global trend of decreased exploration expenditures since 1997, based on data reported by

Metals Economics Group (MEG) of Halifax, Canada. Research by the U.S. Geological Survey (USGS) and by MEG indicated that exploration in the region continues to account for less than 9% of the 2000 world exploration budget. The region has been able to sustain interest in certain areas, primarily by junior exploration companies specializing in the region.

In Western Europe, updated mining legislation, deregulation, and tax relief have encouraged mineral resource exploration, primarily for copper, gold, lead, and zinc; exploration for diamonds was conducted in Scandinavia. Mineral exploration activity in Western Europe during 1999 focused on Sweden, Ireland, Finland, Spain, Sardinia, and Greenland (in order of decreasing activity) based on information collected by the USGS from published company reports and industry publications. Sweden has been home to significant metal mining activity for at least a thousand years and still offers very high potential for new mineral discoveries. Exploration expenditure in Sweden during 2000 was more than $18 million. As shown in table 2, drilling continued to extend gold resources at the Olympias deposit in Greece and the Skellefte Mine in Sweden. Exploration for base metals focused on the Rathdowney Trend of Ireland, the Penikat/Portimo deposit in Finland, and extensions of the Renstrom Mine in Sweden. Gold exploration in Greenland continued, but at a reduced level from that reported in 1997. Many prior mining areas of Europe are being reevaluated with current technology. This took place after gravity surveying led to the recent discovery of the concealed Las Cruces massive sulfide deposit in Spain.

After an economic winnowing process subsequent to the collapse of the FSU and restructuring of Central Eurasia, industries that have survived have been increasingly able to attract foreign investment in the fuels, industrial minerals, and base-metals sectors. In addition, political instability and falling world metal prices have reduced the number of projects reaching the development stage. Foreign exploration companies to date have shown reluctance to incur sizable exploration costs in remote areas, unless they are assured of a reasonable chance to receive economic benefits if discoveries are developed in the future. In 2000, Bulgaria, Romania, and Russia attracted the most interest by Western companies for mineral exploration.

Production

The data presented below in the "Commodity Overview" section were obtained from the summary table in this report and from comparable data in the summary tables of the preceding reports for 1997, 1998, and 1999 in the Minerals Yearbook, volume III, Europe and Central Eurasia.

A salient aspect to emerge from the data in these tables was the increase of secondary production and recovery of nonferrous metals. It should be noted, however, that data for Central Eurasia for secondary metals were incomplete. Although ferrous scrap collection as an important component of the raw materials matrix has been in circulation for some time, the large-scale secondary recovery of the majority of nonferrous metals has been a more recent undertaking. The statistics for nonferrous scrap metal recovery, which have become more readily available in recent years, have shown Europe and Central Eurasia to be playing a major role in this endeavor, with Western Europe as the dominant producer of such secondary nonferrous metals as aluminum, copper, lead, tin, and zinc. Despite playing a much lesser role in secondary nonferrous scrap production, Central Europe and the Balkans and Central Eurasia also began to display some results in this endeavor. Russia in particular showed marked increases in the output of secondary copper and lead from 1997 to 2000.

Available Russian data for 1999 also point to some of the telling issues associated with transitional CIS commerce in nonferrous scrap. A large percentage of collected nonferrous metal scrap was being exported, of which large quantities were being exported in the form of simple manufactured products intended for remelting. Because this was exacerbating critical shortages of scrap in the Russian economy, the Russian Government passed a law to sharply curtail scrap exports in 2000 [to 106,200 metric tons (t) of aluminum and 18,800 t of copper in 2000 from 407,900 t of aluminum and 201,100 t of copper in 1999]. Russia also actively sought to impose additional measures to further curtail nonferrous scrap exports.

Commodity Overview

Metals

Aluminum, Alumina, and Bauxite.—Although production of bauxite in Europe and Central Eurasia was just less than 10% of total world output, the region's production of alumina and primary aluminum constituted 24% and 33%, respectively, of total world production. Despite the major and virtually equal shares of alumina and primary aluminum that were produced by Western Europe and Central Eurasia, Western Europe was the primary producer of secondary aluminum contributing slightly more than 90% of the 35% of total world production contributed by Europe and Central Eurasia. Western Europe showed apparent steady growth of secondary recovery of aluminum—28% in 1998, 29% in 1999, and 31% in 2000. In contrast to Western Europe, secondary recovery of aluminum in the Balkans, Central Europe, and Central Eurasia remained about 2% of total world production during this period.

Copper.—In 2000, mine production of copper in Europe and Central Eurasia amounted to about 14% of world production; major contributions by the Balkans and Central Europe (mainly Poland) and by Central Eurasia amounted to about 5% and 8%, respectively, of total world production. Central Eurasia, Western Europe, and Central Europe and the Balkans contributed about 9%, 8%, and 4%, respectively, of total world production of primary refined copper. Europe and Central Eurasia was the leading world producing region of secondary copper with about 59% of the total world output. Western Europe led in secondary copper recovery in 2000 with 44% of total world output. Central Eurasia's share of secondary copper recovery amounted to about 10% of the world total, showing a marked increase compared with 3% of world production in 1998. Secondary copper production in Central Europe and the Balkans reached 5% of total world output from 3% in 1999.

Gold.—Europe and Central Eurasia accounted for about 12% of the world's total production of gold. In 2000, this share of world production, however, continued to be dominated by Central Eurasia's gold production (in descending order of output from Russia, Uzbekistan, Kazakhstan, and Kyrgyzstan. Central Eurasia's share of world gold production has remained the same in 1999 and 2000, amounting to about 10% of total world gold production.

Iron, Steel, and Ferroalloying Material.—In 2000, Europe and Eurasia's share of world output of iron ore, pig iron, and crude steel amounted to 18%, 31%, and 35%, respectively. Western Europe and Central Eurasia (mainly Russia and Ukraine) accounted for 20% and 12%, respectively, of world output of crude steel (table 2). Central Eurasia's share of world steel production (12%) represented an increase in the area's share of world crude steel production, compared with output levels achieved in 1999 (11%) and 1998 (9%). In Europe and Central Eurasia, the mine output of such ferroalloying materials as chromite, manganese, and nickel amounted to 24%, 19%, and 24%, of total world output, respectively, with the Central Eurasian countries of Kazakhstan, Ukraine, and Russia, accounting for the dominant share of these percentages, respectively. Central Eurasia (Russia) and Western Europe also contributed 22% and 16% of total world output of plant nickel, respectively.

Lead and Zinc.—Europe and Central Eurasia accounted for about 13% of total world mine production of lead, which represented a decline compared with 15% of world production achieved in 1999. Western Europe led the region with 8% of world mine production of lead. Central Eurasia was a relatively minor mine producer of lead whose output had not exceeded 2% of total world production for each year from 1997 to 2000. Central Europe and the Balkans saw mine lead production decline from 6% of world production in 1999 to 4% in 2000. Western Europe was also the region's major producer of primary and secondary refined lead, accounting for 21% and 32%, respectively, of total world production. Central Eurasia accounted for about 8% of total world primary refined lead production and showed a steady upward production trend during the 1997 to 2000 period. Similarly, Europe and Central Eurasia's mine output of zinc accounted for only 15% of world production; however, the production of primary and secondary zinc metal accounted for about 69% and 29% of total world production, respectively. Western Europe accounted for about 50% of the world's production of primary zinc metal and 28% of its recovery of secondary zinc. Although secondary recovery of zinc in Central Eurasia and in Central Europe and the Balkans was insubstantial, the production of primary zinc reached 12% and 8%, respectively, of total world production, which doubled their shares of world production (6% and 4%) in 1998.

Mercury.—In 2000, Western Europe accounted for about 40% of world production of mercury. With Central Eurasia having contributed about 26% of total world production, the total output of mercury by Europe and Central Eurasia amounted to 66% of world production.

Nickel.—Europe and Central Eurasia's 24% share of world mine production of nickel in 2000 was almost entirely accounted for by the operations of Russia's Norilsk mining, smelting, and refining complex, which alone accounted for about 22% of world output. Norilsk's production was obtained from complex sulfide ores at Norilsk in Western Siberia and to a lesser degree on the Kola peninsula, near the border with Finland. A much smaller quantity of mined nickel came from the Ural Mountains (Russia accounting for the major portion of this production, and Kazakhstan accounting for some production, as well). In Western Europe, relatively small quantities of nickel were mined in Greece from laterite deposits, and a much lesser amount was produced by Finland.

Palladium and Platinum.—As in the case of nickel, Russia's Norilsk complex accounted for the major share of the country's output of platinum-group metals (PGMs); a much smaller quantity of PGMs, mainly platinum, came from Russian placer deposits. In 2000, Russia produced about 94 t of palladium and 30 t of platinum, which accounted for virtually all Europe and Central Eurasia's output of PGMs. Only very minor platinum and palladium production was accounted for by Finland, Poland, and Serbia and Montenegro. Russia's production of palladium and platinum represented about 54% and 19%, respectively, of total world mine production in 2000. Whereas platinum is also used to a large extent in the manufacture of jewelry and numismatics, both palladium and platinum have found substantial application in the industrial sector where they are used to a great extent in the production of catalytic converters in automobiles to control emissions.

Russia's dominant role in world palladium production had a strong influence on the world market. In 2000, price spikes in PGMs, particularly palladium, were associated with uncertainties regarding the quantity of Russian exports and delays in exports. Palladium prices rose to about $1,000 per troy ounce in 2000 from $153 per troy ounce in 1995. It was uncertain to what extent the Russian Government was deliberately trying to raise the price of palladium, but the high price was to some extent jeopardizing future palladium sales from Norilsk. This had led some major auto makers to begin to look for ways to develop substitutes for palladium. Russia has the potential to increase its production of PGMs by more than 40% in the next few years, which is a major factor in determining the world's potential PGM supplies.

Silver.—Europe and Central Eurasia was an important source of mined silver, accounting for about 17% of world production in 2000, with major contributions coming from Central Europe and the Balkans (7%) and Central Eurasia (8%). The major portion of this output was byproduct of nonferrous metals processing.

Tin.—Mine output of tin in Europe and Central Eurasia, by world standards, was small, about 3% of total world production, with most production stemming from Central Eurasia (Russia). The production of secondary tin, however, was significant, accounting for 38% of world production, with Western Europe's share of world secondary tin output amounting to about 35% of total world output. Western Europe's output of secondary tin has shown significant growth compared with its 18% share in 1998. The estimated production of secondary tin in Central Eurasia has contributed about 2% of total world production each year from 1998 to 2000.

Titanium.—Europe and Central Eurasia's mine production of titanium was substantial, accounting for about 24% of world output in 2000, with both Western Europe and Central Eurasia (Ukraine) contributing equal amounts to the world total. Central Eurasia's share of mine production of titanium had grown to 12% of world production in 2000 from 4% in 1998. In 2000, Central Eurasia accounted for about 64% of total world production of titanium sponge, with Russia contributing almost 80% of Central Eurasia's production.

Tungsten.—In 2000, Central Eurasia and Western Europe contributed 9% and 6%, respectively, to the world mine output of tungsten, which was a decrease from 12% and 7%, respectively, in 1999.

Industrial Minerals

Cement.—Europe and Central Eurasia accounted for about 17% of world cement production during the period from 1997 to 2000. Production was varied in all areas during this time. In 2000, Western Europe accounted for about 12% of total world output of cement; Central Europe and the Balkans and Central Eurasia both accounted for about 3% of total world production of cement.

Diamond.—Europe and Central Eurasia was one of the world's major diamond-producing regions. In 2000, the region accounted for about 20% of world production of natural diamonds and about 80% of world synthetic diamond production. Russia, which produced more than 23 million carats of natural diamonds, accounted for virtually all the region's production of natural gem and industrial-grade diamonds. In 2000, Russia's output of natural diamonds increased by about 1% compared with that of 1999. Within the category of natural diamonds, Russia produced about equal amounts of gem- and industrial-grade material.

Europe and Central Eurasia was the dominant world producer of synthetic diamonds. In 2000, the region produced about 197 million carats, or about 80% of world production. Central Eurasia, dominated by Russian output of about 80 million carats, accounted for about 46% of world production. Western Europe, dominated by Ireland's production of about 60 million carats, accounted for about 34% of total world production. The distribution of synthetic diamond production into its gem- and industrial-grade components, however, was not available.

Nitrogen in Ammonia.—Central Eurasia was the largest regional producer of nitrogen in ammonia, abounding for about 14% of world production in 2000; lesser contributions to world output by Western Europe and by Central Europe and the Balkans amounted to 10% and 4%, respectively.

Phosphate Rock.—Major production of phosphate rock in Europe and Central Eurasia came from Central Eurasia (Russia), which accounted for about 10% of world production in 2000; production during the period from 1997 to 2000 has been uneven, ranging from 4% to 10% of world production. Phosphate rock production in other areas of Europe and Central Eurasia was insignificant.

Potash (K_2O Equivalent).—The region of Europe and Central Eurasia was a substantial source of potash, accounting for 49% of world production in 2000. Central Eurasia, which was the leading producer in the region, accounted for about 30% of total world production, followed by Western Europe, producing 19%.

Salt.—Major mine production of salt came from Western Europe, which accounted for about 20% of world production in 2000. Central Europe and the Balkans, led by Poland, accounted for about 4% of world output. Central Eurasia's share of salt production remained stable at about 3% of world production.

Sulfur.—Europe and Central Eurasia's share of world sulfur production steadily rose to about 28% in 2000 from 24% in 1997. In 2000, Central Eurasia led the region in the production of sulfur from all sources, accounting for about 14% of world output. Western Europe's share of world sulfur production was about 11%, while that of Central Europe and the Balkans, led by Poland, was about 4%, an increase from the 3% level attained in 1999 and 1998. All three subregions increased their shares of world sulfur production from the 12%, 10%, and 3%, respectively, in 1999.

Mineral Fuels

Anthracite.—Central Eurasia was the region's chief producer of anthracite, accounting for 5% of total world production in 2000; production by Central Europe and the Balkans, however, was negligible, and that of Western Europe accounted for about 2% of world output, a decline from the 4% share in attained 1999.

Bituminous Coal.—Central Eurasia accounted for about 9% of total world production of bituminous coal and also was the largest hard-coal-producing area in Europe and Central Eurasia, which accounted for 15% of world output. Production in Central Europe and the Balkans accounted for a 4% share of world output.

Lignite.—The region of Europe and Central Eurasia was the world's dominant regional producer of lignite, which almost attained a 70% share of world output in 2000. Lignite production by Western Europe, Central Europe and the Balkans, and Central Eurasia, respectively, was 28%, 27%, and 11% of world output in 2000.

Natural Gas.—Central Eurasia (mainly Russia) held a substantial share of the world's production of natural gas, which reached about 28% of the total in 2000 but remained unchanged from the 1999 and 1998 levels. Western Europe, however, saw its share of natural gas production decline to 9% in 2000 from 12% in 1999 and 1998 from about 13% of the world total in 1997. A much lesser production share by Central Europe and the Balkans saw an increase to 2% from 1% of total world natural gas production.

Petroleum.—Central Eurasia (mainly Russia) also led the region in the production of petroleum, accounting for about 12% of world output in 2000. Western Europe was not far behind with a 9% share of total world petroleum output. Petroleum production in Central Europe and the Balkans was less than 1% of total world output. The offshore oil deposits in the Caspian Sea were a major potential source of future world oil production.

Uranium.—Central Eurasia was the major regional source of mined uranium (U_3O_8), whose share of world output (U_3O_8 basis) has been steadily rising to 19% in 2000 and 18% in 1999 from 17% in 1998. On balance, Europe and Central Eurasia accounted for about 22% of world's uranium production in 2000.

Trade

Mineral commodity trade in transitional economy countries of Central Eurasia and of Central Europe and the Balkans showed mixed features. Of the transitional economy countries, the countries of the CIS were the major exporters of extracted and processed mineral commodities. Exports primarily went to countries outside the CIS, although there was also significant trade among the countries of the CIS for mineral products in which these countries were deficient, particularly for those mineral commodities that were not salable on world markets. Mineral commodity trade in Central Europe and the Balkans was largely distinguished by import dependence on natural gas and petroleum, on raw materials for iron and steel production, as well as on a variety of nonferrous metal ores. The CIS continued be a significant exporter to the Balkan and Central European market of many of these commodities, especially hydrocarbons. With respect to general trade trends, the CEFTA member countries of Central Europe and the Balkans gradually have been redirecting a substantial portion of their trade from the FSU toward markets in the EU.

Steel trade in the region was of special importance. There has been a significant flow of steel to Western Europe from Central Europe and the Balkans and Central Eurasia. World steel supply has been outstripping demand, and much of this surplus production has been targeted to the European market. In 2000, the top eight countries sending material into the EU, in order of descending tonnage, were Russia, Turkey, Poland, the Czech Republic, Ukraine, Slovakia, Brazil, and Bulgaria. These countries accounted for more than 55% of EU imports. Since 1997, imports from countries outside the EU into Italy, Spain, Sweden, and the United Kingdom have doubled or more than doubled and into Germany have risen by about one-half. Italy, Spain, and the United Kingdom were the largest recipients of steel imports deriving from outside the EU. While imports by the EU have doubled since 1997, imports by the United States, during the same period, have fallen by 12%.

During the latter half of the 1990s, an array of dumping charges were initiated against many steel producing countries in Central Eurasia and Central Europe and the Balkans. During the 1995 to 2002 period, 74 antidumping actions were initiated against Russian ferrous metals exporters, 33 of which resulted in sanctions. Other CIS steel producing countries were experiencing similar problems. The major problem, according to Russian analysts, was that Russian steel exports competed primarily based on their low price because they lacked the necessary attributes to compete on quality, which made these exports an easy target for antidumping actions. Russian analysts did not envision a quick resolution of this problem owing to the overcapacity for steel production on world markets. A longer term solution to facilitate sales on the world and domestic markets would require a restructuring of the Russian steel industry together with continued domestic economic restructuring to facilitate growth as well as an underlying modernization of the country's financial and legal systems.

The issue of iron and steep scrap was another aspect of steel trade that was of some concern in the region. During the 1990s, the transitional economy countries of Europe and Central Eurasia became a major source of ferrous scrap feedstock for Western Europe, which increasingly had been redirecting its steelmaking operations towards greater use of electric furnaces (EAFs) to obtain greater energy savings and environmental benefits. In Central Europe and in the Balkans and Central Eurasia, the trend toward using EAFs, although nowhere near the levels attained in Western Europe, also had been growing incrementally. In the latter part of the 1990s, iron and steel scrap exports to Western Europe decreased. Consequently, decreasing supplies of ferrous scrap to Western Europe and rising exports of steel from Central Europe and from the Balkans and Central Eurasia had pressed the steel interests in Western Europe to seek a reversal of these trends.

On balance, the EU and the United States continued to share the largest two-way trade and investment relationship in the world. In 1999, the U.S. trade deficit with the EU was about $44 billion. U.S. merchandise exports to the EU were more than $151 billion. U.S. merchandise imports from the EU were about $195 billion. In 1998, U.S. foreign direct investment in the EU was almost $434 billion, about one-half the country's foreign direct investment abroad; the EU's direct investment in the U.S. was almost $482 billion, also about one-half its investment abroad. In contrast, commercial activity between the United States and Central Europe and the Balkans and Central Eurasia was significantly less developed.

Consumption

Consumption of practically all mineral commodities in the transitional economy countries of Europe and Central Eurasia had fallen sharply during the 1990s. To some extent, this linked the future of many of the mineral industries in these countries to a revival of consumption in this region. If there were to be a marked revival of demand, then many mineral commodities that were not economic to export could be marketed domestically. A revival of demand also would lessen the pressure to export many mineral products, which could dampen some of the dumping charges that were being leveled at many of the transitional economy countries. A revival of domestic demand would result not only in increased domestic consumption, but also in the production from these mineral commodities of more value-added products for export. If a large portion of the population of the transitional economy countries were to consume minerals at a rate comparable to other more developed industrialized economies, then it would significantly change the mineral trade profile of this region, probably to the economic advantage of some mineral producers and to the disadvantage of some consumers of mineral products in other parts of the world. As would be the case with any major populated region of the world that was raising its mineral consumption to the level of more advanced industrialized countries, the overall demand for the world's mineral resources would increase.

Consumption of minerals in Western Europe has not shown any significant shifts in 2000 and several preceding years. The area's low population growth combined with the attributes of an advanced industrial economy have accounted for the steady rate of mineral consumption.

Outlook

Metals

Western Europe.—With a technologically advanced industrial base but a static demographic picture, Western Europe should continue to rely less on domestic mining for most metals and more on imported ore and concentrates of ferrous and nonferrous metals. An increased use of secondary metals also will reduce reliance on primary raw materials. Most likely production increases in this area will be associated with increased exports of durables and consumer products manufactured in Western Europe. Domestic consumption should not be expected to rise in the near future.

Central Europe and the Balkans.—In contrast to Western Europe, almost all the countries in this subregion have a significantly lower base of development with respect to markets, industrial efficiency, commercial and social infrastructure, and per capita GDP. The process of transitioning to market economies that would be more in accord with those of Western Europe will continue. This development will require major inputs of iron and steel as well as nonferrous metals to modernize the area's industries and infrastructure. Consequently, increasing consumption of these metals is to be anticipated. This area does have local resources of such nonferrous metals as bauxite, copper, lead, and zinc, whose output should increase to meet most rising consumption requirements. Central Europe, however, will continue to rely on imports of iron ore and concentrate mainly from the CIS and the EU. The drawdown on stocks of iron and steel scrap for domestic consumption also should increase to meet the changing profiles of the area's steel industries.

Central Eurasia.—The CIS, led by Russia, Kazakhstan, and Ukraine will remain a major supplier of most ferrous, nonferrous, and precious metals to the world market for the foreseeable future. As in the case of Central Europe, increased domestic consumption of these commodities is to be anticipated but exports should remain at a high level, given the high profits that are available from their sale outside the region.

Industrial Minerals

Western Europe.—The production of most major industrial minerals has remained stable during recent years. As in the case of metals, production increases more than likely would be directed toward export rather for domestic sales.

Central Europe and the Balkans.—There are adequate resources of most industrial minerals in the region to meet anticipated production and consumption increases. Almost all cement manufacturing and associated quarrying activities have been acquired by major EU cement and building materials manufacturers, and many of these enterprises have been undergoing modernization to bring them into accord with EU standards.

Central Eurasia.—There are adequate resources of most industrial minerals in the region to meet any anticipated production and consumption increases.

Mineral Fuels

Western Europe.—With the exception of North Sea hydrocarbon production, Western Europe's sources of energy should continue to be based on imports from the Middle East and from the CIS area. A resolution of the pipeline issue described in this report would increase Western Europe's imports from Caspian Sea oil-and-gas-producing areas of the CIS. Consonant with the expected consumption of most nonfuel minerals, major increases of fuel consumption in the near term were not anticipated.

Central Europe and the Balkans.—Most of the countries in the region are net importers of energy. Domestic production of brown coal and lignite for electric power generation will be maintained to reduce the cost of imported natural gas and petroleum, which has been largely supplied by the CIS. Poland's hard coal industry will continue to modernize and should continue to play an important regional role in the energy field.

Central Eurasia.—Russia and other CIS oil and gas producers will continue to be among the major providers of hydrocarbons to the world market. The rate of increases of future deliveries of these commodities to the world market, however, also will depend in large measure on the resolution of the pipeline issue for their delivery. The area has sufficient resources to meet demand increases in both domestic and export markets.

TABLE 1
EUROPE AND CENTRAL EURASIA: OVERVIEW OF POPULATION AND GROSS DOMESTIC PRODUCT IN 2000

	Population		Gross domestic product 1/		
Major areas and economic affiliations	Total	Growth rate 2/	Gross value (billions)	Per capita	Growth rate 2/
Western Europe:					
European Union:					
Austria	8,150,835	0.24	$203	$25,000	3.10
Belgium and Luxembourg	10,258,762	0.16	259	25,300	4.10
Denmark, Faroe Islands, Greenland	5,352,815	0.30	138	25,500	2.80
Finland	5,175,783	0.16	118	22,900	5.60
France	59,551,227	0.37	1,448	24,400	3.10
Germany	83,029,536	0.27	1,936	23,400	3.00
Greece	10,623,835	0.21	182	17,200	3.80
Ireland	3,840,838	1.12	82	21,600	9.90
Italy	57,679,825	0.07	1,273	22,100	2.70
Netherlands	15,981,472	0.55	388	24,400	4.00
Portugal	10,066,253	0.18	159	15,800	2.70
Spain	40,037,995	0.10	721	18,000	4.00
Sweden	8,875,053	0.02	197	22,200	4.30
United Kingdom	59,647,690	0.23	1,360	22,800	3.00
Total population and average growth rate	378,271,919	0.28	XX	XX	XX
Total GDP; average per capita GDP; average net GDP growth rate	XX	XX	8,464	20,707	3.74
European Free Trade Association:					
Iceland	277,906	0.54	7	24,800	4.30
Norway	4,503,440	0.49	124	27,700	2.70
Switzerland	7,283,274	0.27	207	28,600	3.00
Total population and average growth rate	12,064,620	0.43	XX	XX	XX
Total GDP; average per capita GDP; average net GDP growth rate	XX	XX	331	18,767	1.90
Unaffiliated countries, Malta	394,583	0.74	6	14,300	3.40
Central Europe and the Balkans:					
Central European Free Trade Agreement:					
Bulgaria	7,707,495	-1.14	48	6,200	5.00
Czech Republic	10,264,212	-0.07	132	12,900	2.50
Hungary	10,106,017	-0.32	113	11,200	5.50
Poland	38,633,912	-0.03	328	8,500	4.80
Romania	22,364,022	-0.21	133	5,900	2.20
Slovakia	5,414,937	0.13	55	10,200	2.20
Slovenia	1,930,132	0.14	23	12,000	4.50
Total population and average growth rate	96,420,727	-0.21	XX	XX	XX
Total GDP; average per capita GDP; average net GDP growth rate	XX	XX	832	9,557	3.18
Unaffiliated countries:					
Albania	3,510,484	0.88	11	3,000	7.50
Bosnia and Herzegovina	3,922,205	1.38	7	1,700	8.00
Croatia	4,334,142	1.48	25	5,800	3.20
Macedonia	2,046,209	0.43	9	4,400	5.00
Serbia and Montenegro	10,677,290	-0.27	24	2,300	15.00
Total population and average growth rate	24,490,330	0.78	XX	XX	XX
Total GDP; average per capita GDP; average net GDP growth rate	XX	XX	52	3,725	5.93
Central Eurasia:					
Commonwealth of Independent States:					
Armenia	3,336,100	-0.21	10	3,000	5.00
Azerbaijan	7,771,092	0.32	24	3,000	11.40
Belarus	10,350,194	-0.15	79	7,500	4.00
Georgia	4,989,285	-0.59	23	4,600	1.90
Kazakhstan	16,731,303	0.03	86	5,000	10.50
Kyrgyzstan	4,753,003	1.44	13	2,700	5.70
Moldova	4,431,570	0.05	11	2,500	-1.50
Russia	145,470,197	-0.35	1,120	7,700	6.30
Tajikistan	6,587,681	2.12	7	1,140	5.10
Turkmenistan	4,603,244	1.85	20	4,300	16.00
Ukraine	48,760,474	-0.78	189	3,850	6.00
Uzbekistan	25,155,064	1.60	60	2,400	2.10
Total population and average growth rate	282,939,207	0.44	XX	XX	XX
Total GDP; average per capita GDP; average net GDP growth rate	XX	XX	1,642	3,974	6.04

See footnotes at end of table.

TABLE 1--Continued
EUROPE AND CENTRAL EURASIA: OVERVIEW OF POPULATION AND GROSS DOMESTIC PRODUCT IN 2000

Major areas and economic affiliations	Population Total	Population Growth rate 2/	Gross domestic product 1/ Gross value (billions)	Gross domestic product 1/ Per capita	Gross domestic product 1/ Growth rate 2/
Central Eurasia--Continued:					
Unaffiliated countries:					
Estonia	1,423,316	-0.55	$15	$10,000	6.40
Latvia	2,385,231	-0.81	17	7,200	5.50
Lithuania	3,610,535	-0.27	26	7,300	2.90
Total population and average growth rate	7,419,082	-0.54	XX	XX	XX
Total GDP; average per capita GDP; average net GDP growth rate	XX	XX	58	8,167	4.93

XX Not applicable.

1/ Calculated on the basis of purchasing power parity.

2/ Calculated as percentage change from 1999 to 2000.

Source: U.S. Central Intelligence Agency, 2001, The world factbook 2001: U.S. Central Intelligence Agency, 658 p. Country references are i
the respective country chapters in this volume.

TABLE 2
EUROPE AND CENTRAL EURASIA: SELECTED EXPLORATION SITES IN 2000

Location	Type 1/	Site	Commodity 2/	Company	Resource notes 2/ 3/	Exploration notes 4/
Finland	E	Penikat/Portimo	PGM, Ni, Cu	Outokumpu Oyj	2.9 million troy ounces PGM	Extensive drilling.
Greece	F	Olympias	Au, Ag	TVX Gold Inc.	4.09 million troy ounces Au equivalent	Development approved.
Greenland	E	Nalunaq	Au	Crew Development Corp.	425,000 troy ounces Au	Bulk sampling and test mining.
Romania	F	Rosia Montana	Au, Ag	Gabriel Resources Ltd.	62 million troy ounces Ag, 11 million troy ounces Au	Feasibility drilling.
Sweden	P	Renstrom/Simon	Au, Zn, Cu, Pb, Ag	Boliden Ltd.	Data not released	Extensive drilling.
Do.	do.	Skellefte/Kristineberg	Au, Cu	do.	do.	Do.

1/ D--approved for development; E--active exploration; F--feasibility work ongoing/completed; P--exploration at producing site.

2/ Ag--silver; Au--gold; Cu--copper; Ni--nickel; Pb--lead; PGM--platinum-group metals; Zn--zinc.

3/ Based on 2000 data reported from various sources. Values vary from measured reserves to identified resources. Data not verified by the USGS.

4/ Indicates stage of ongoing activity.

TABLE 3
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Metals													
	Iron and steel						Ferroalloying materials							
											Nickel			
	Iron ore		Pig iron and direct-reduced iron		Crude steel		Chromite		Manganese ore		Mine		Plant	
Region and/or country	Metal content	Percent change 3/	Metal content	Percent change 3/	Gross weight	Percent change 3/	Gross weight	Percent change 3/	Gross weight	Percent change 3/	Metal content	Percent change 3/	Metal content	Percent change 3/
Central Eurasia:														
Armenia	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Azerbaijan	NA	NA	--	--	25	--	--	--	--	--	--	--	--	--
Belarus	--	--	--	--	1,623	21	--	--	--	--	--	--	--	--
Estonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Georgia	--	--	--	--	50	233	--	--	59	18	--	--	--	--
Kazakhstan	9,200	(4)	4,010	17	4,799	18	2,607	8	720	(27)	3	(57)	--	--
Kyrgyzstan	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Latvia	--	--	--	--	500	4	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	--	905	14	--	--	--	--	--	--	--	--
Russia	50,000	(39)	46,518	1,053	59,098	15	100	--	115	5	270	4	248	4
Tajikistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ukraine	30,600	17	25,699	17	31,780	19	--	--	2,741	38	--	--	--	--
Uzbekistan	--	--	--	--	420	22	--	--	--	--	--	--	--	--
Total	90,000	(24)	76,227	159	99,200	16	2,700	8	3,635	16	273	2	248	4
Percentage of world total	15	(30)	12	145	12	8	19	5	18	17	22	(8)	22	(3)
Eastern and Central Europe:														
Albania	--	--	10	--	180	3,500	70	(11)	--	--	--	--	--	--
Bosnia and Herzegovina	50	43	100	--	150	36	--	--	2	--	--	--	--	--
Bulgaria	300	58	1,220	11	1,900	(5)	--	--	50	--	--	--	--	--
Croatia	--	--	--	--	68	(12)	--	--	--	--	--	--	--	--
Czech Republic	--	--	4,621	15	5,700	2	--	--	--	--	--	--	--	--
Hungary	--	--	1,340	2	1,871	3	--	--	20	33	--	--	--	--
Macedonia	9	800	--	--	--	--	5	--	--	--	--	(100)	--	(100)
Poland	--	--	6,492	23	10,498	19	--	--	--	--	--	--	(4/)	--
Romania	70	(1)	3,069	2	4,770	10	--	--	22	(63)	--	--	--	--
Serbia and Montenegro	15	--	563	317	682	202	--	--	--	--	--	--	--	--
Slovakia	200	(20)	3,000	(3)	3,600	--	--	--	--	--	--	--	--	--
Slovenia	--	--	--	--	450	11	--	--	--	--	--	--	--	--
Total	644	15	20,400	13	29,900	10	75	(5)	94	22	--	(100)	(4/)	(100)
Percentage of world total	(5/)	--	3	7	4	3	1	(8)	(5/)	--	--	--	--	--
Western Europe:														
European Free Trade Assosciation														
Iceland	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Norway	369	(63)	60	--	620	1	--	--	--	--	3	--	59	(20)
Switzerland	--	--	100	--	1,140	14	--	--	--	--	--	--	--	--
Total	369	(63)	160	--	1,760	9	--	--	--	--	3	--	59	--

See footnotes at end of table.

(Thousand metric tons, unless otherwise specified)

	Metals															
	Iron and steel						Ferroalloying materials									
											Nickel					
	Iron ore		Pig iron and direct-reduced iron		Crude steel		Chromite		Manganese ore		Mine		Plant			
Region and/or country	Metal content	Percent change 3/	Metal content	Percent change 3/	Gross weight	Percent change 3/	Gross weight	Percent change 3/	Gross weight	Percent change 3/	Metal content	Percent change 3/	Metal content	Percent change 3/		
Central Eurasia:																
Armenia	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Azerbaijan	NA	NA	--	--	25	--	--	--	--	--	--	--	--	--		
Belarus	--	--	--	--	1,623	21	--	--	--	--	--	--	--	--		
Estonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Georgia	--	--	--	--	50	233	--	--	59	18	--	--	--	--		
Kazakhstan	9,200	(4)	4,010	17	4,799	18	2,607	8	720	(27)	3	(57)	--	--		
Kyrgyzstan	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Latvia	--	--	--	--	500	4	--	--	--	--	--	--	--	--		
Lithuania	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Moldova	--	--	--	--	905	14	--	--	--	--	--	--	--	--		
Russia	50,000	(39)	46,518	1,053	59,098	15	100	--	115	5	270	4	248	4		
Tajikistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Ukraine	30,600	17	25,699	17	31,780	19	--	--	2,741	38	--	--	--	--		
Uzbekistan	--	--	--	--	420	22	--	--	--	--	--	--	--	--		
Total	90,000	(24)	76,227	159	99,200	16	2,700	8	3,635	16	273	2	248	4		
Percentage of world total	15	(30)	12	145	12	8	19	5	18	17	22	(8)	22	(3)		
Eastern and Central Europe:																
Albania	--	--	10	--	180	3,500	70	(11)	--	--	--	--	--	--		
Bosnia and Herzegovina	50	43	100	--	150	36	--	--	2	--	--	--	--	--		
Bulgaria	300	58	1,220	11	1,900	(5)	--	--	50	--	--	--	--	--		
Croatia	--	--	--	--	68	(12)	--	--	--	--	--	--	--	--		
Czech Republic	--	--	4,621	15	5,700	2	--	--	--	--	--	--	--	--		
Hungary	--	--	1,340	2	1,871	3	--	--	20	33	--	--	--	--		
Macedonia	9	800	--	--	--	--	5	--	--	--	--	(100)	--	(100)		
Poland	--	--	6,492	23	10,498	19	--	--	--	--	--	--	(4/)	--		
Romania	70	(1)	3,069	2	4,770	10	--	--	22	(63)	--	--	--	--		
Serbia and Montenegro	15	--	563	317	682	202	--	--	--	--	--	--	--	--		
Slovakia	200	(20)	3,000	(3)	3,600	--	--	--	--	--	--	--	--	--		
Slovenia	--	--	--	--	450	11	--	--	--	--	--	--	--	--		
Total	644	15	20,400	13	29,900	10	75	(5)	94	22	--	(100)	(4/)	(100)		
Percentage of world total	(5/)	--	3	7	4	3	1	(8)	(5/)	--	--	--	--	--		
Western Europe:																
European Free Trade Assosciation																
Iceland	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Norway	369	(63)	60	--	620	1	--	--	--	--	3	--	59	(20)		
Switzerland	--	--	100	--	1,140	14	--	--	--	--	--	--	--	--		
Total	369	(63)	160	--	1,760	9	--	--	--	--	3	--	59	--		

See footnotes at end of table.

TABLE 3--Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Metals--Continued															
	Aluminum								Antimony, mine output		Copper					
					Metal								Refined 6/			
	Bauxite		Alumina		Primary		Secondary				Mine		Primary		Secondary	
Region and/or country	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/	Quantity (metric tons)	Percent change 3/	Metal content	Percent change 3/	Metal content	Percent change 3/	Metal content	Percent change 3/
Central Eurasia:																
Armenia	--	--	--	--	--	--	--	--	--	--	14	--	--	--	--	--
Azerbaijan	--	--	200	1,900	(4/)	(5/)	--	--	--	--	--	--	--	--	--	--
Belarus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Estonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Georgia	--	--	--	--	--	--	--	--	--	--	8	--	--	--	--	--
Kazakhstan	3,730	3	1,217	6	--	--	--	--	--	--	430	15	395	9	--	--
Kyrgyzstan	--	--	--	--	--	--	--	--	150	50	--	--	--	--	--	--
Latvia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Russia	4,200	(12)	2,850	7	3,245	3	--	--	4,500	13	570	8	640	(5/)	200	33
Tajikistan	--	--	--	--	300	31	--	--	2,000	11	--	--	--	--	--	--
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ukraine	--	--	1,360	11	119	6	129	--	--	--	--	--	--	--	--	--
Uzbekistan	--	--	--	--	--	--	3	--	--	--	92	39	75	4	5	--
Total	7,900	(5)	5,600	11	3,700	5	132	(5/)	7,000	13	1,110	13	1,110	3	200	32
Percentage of world total	6	(11)	11	9	15	1	2	10	6	3	8	7	9	--	10	27
Eastern and Central Europe:																
Albania	--	(100)	--	--	--	--	--	--	--	--	--	--	(4/)	--	--	--
Bosnia and Herzegovina	75	--	50	25	95	1,800	5	--	--	--	--	--	--	--	--	--
Bulgaria	--	--	--	--	--	--	4	--	--	--	76	1	26	73	5	--
Croatia	--	--	--	--	35	--	16	7	--	--	--	--	--	--	--	--
Czech Republic	--	--	--	--	--	--	40	--	--	--	--	--	--	--	20	--
Hungary	1,047	16	150	(49)	34	13	65	--	--	--	--	--	12	--	--	--
Macedonia	--	--	--	--	--	--	5	--	--	--	10	11	--	--	--	--
Poland	--	--	--	--	52	2	6	--	--	--	454	(2)	466	4	20	(9)
Romania	--	--	417	51	179	3	(4/)	--	--	--	16	(6)	14	(30)	4	--
Serbia and Montenegro	630	26	250	60	96	32	--	--	--	--	53	2	46	(4)	40	1,900
Slovakia	--	--	100	--	110	(15)	--	--	--	--	--	--	20	(96)	--	--
Slovenia	--	--	70	(30)	84	20	--	--	--	--	--	--	--	--	--	--
Total	1,752	18	1,037	7	685	21	141	1	--	--	610	(2)	584	(44)	90	68
Percentage of world total	1	12	2	5	3	16	2	(7)	--	--	5	(7)	4	(46)	5	61
Western Europe:																
European Free Trade Assosciation																
Iceland	--	--	--	--	226	2	--	--	--	--	--	--	--	--	--	--
Norway	--	--	--	--	1,026	1	255	43	--	--	--	--	27	(18)	--	--
Switzerland	--	--	--	--	36	6	6	(60)	--	--	--	--	--	--	--	--
Total	--	--	--	--	1,288	1	261	35	--	--	--	--	27	(18)	--	--

See footnotes at end of table.

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Metals--Continued															
	Aluminum								Antimony, mine output		Copper					
					Metal								Refined 6/			
	Bauxite		Alumina		Primary		Secondary				Mine		Primary		Secondary	
Region and/or country	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity (metric tons)	Percent change 3/	Metal content	Percent change 3/	Metal content	Percent change 3/	Metal content	Percent change 3/
Western Europe--Continued:																
European Union																
Austria	--	--	--	--	--	--	158	23	--	--	--	--	2	--	77	1
Belgium	--	--	--	--	--	--	1	--	--	--	--	--	236	17	187	--
Denmark and Greenland	--	--	--	--	--	--	33	136	--	--	--	--	--	--	--	--
Finland	--	--	--	--	--	--	43	--	--	--	12	9	100	(5)	14	(7)
France	--	--	400	(27)	441	(3)	270	13	--	--	(4/)	--	--	--	2	--
Germany	--	--	600	--	644	2	572	18	--	--	--	--	335	24	375	(12)
Greece	1,991	8	600	(4)	163	3	3	--	--	--	--	--	--	--	--	--
Ireland	--	--	1,200	--	--	--	--	--	--	--	--	--	--	--	--	--
Italy	--	--	950	(2)	190	2	568	13	--	--	--	--	--	--	70	141
Luxembourg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands	--	--	--	--	302	6	119	13	--	--	--	--	--	--	--	--
Portugal	--	--	--	--	--	--	18	500	--	--	76	(24)	--	--	--	--
Spain	--	--	1,200	--	366	1	241	8	--	--	23	475	265	10	65	--
Sweden	--	--	--	--	100	4	30	20	--	--	78	10	105	31	25	(17)
United Kingdom	--	--	100	--	305	12	285	4	--	--	--	--	1	--	49	(2)
Total	1,991	(1)	5,100	(4)	2,500	2	2,340	14	--	--	189	2	1,000	16	860	(2)
Total, Western Europe	1,991	(1)	5,100	(4)	3,800	2	2,600	16	--	--	189	2	1,100	15	860	(2)
Percentage of world total	1	(7)	10	(6)	15	(2)	31	7	--	--	1	(4)	8	11	44	(6)
Total, Europe and Central Eurasia	12,000	(2)	11,700	4	8,200	5	2,900	16	6,650	13	1,900	7	2,800	(9)	1,200	7
Percentage of world total	9	(7)	24	2	33	--	35	6	6	3	14	1	21	(13)	59	2
United States	NA	NA	4,780	(3)	3,670	(3)	3,450	(5/)	W	NA	1,470	(8)	1,590	(16)	208	(14)
Percentage of world total	NA	NA	10	(5)	15	(7)	42	(8)	NA	NA	11	(13)	12	(19)	11	(18)
Total, world	135,000	6	49,300	2	24,600	4	8,290	9	118,000	9	13,300	5	13,000	4	1,960	4

See footnotes at end of table.

TABLE 3--Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Metals--Continued															
			Lead						Mercury, mine output		Platinum-group metals				Silver, mine output	
					Refined 6/						Palladium		Platinum			
	Gold, mine output		Mine		Primary		Secondary									
Region and/or country	Quantity (kilograms)	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/
Central Eurasia:																
Armenia	400	(67)	--	--	--	--	--	--	--	--	--	--	--	--	1	--
Azerbaijan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Belarus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Estonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Georgia	2,924	83	(4/)	--	--	--	--	--	--	--	--	--	--	--	34	--
Kazakhstan	28,171	28	39	15	206	29	--	--	--	--	--	--	--	--	927	3
Kyrgyzstan	22,000	10	--	--	--	--	--	--	260	(58)	--	--	--	--	--	--
Latvia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Russia	140,000	11	13	--	59	97	--	--	50	--	94	11	30	11	370	(1)
Tajikistan	2,700	--	1	--	--	--	--	--	40	(47)	--	--	--	--	5	--
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ukraine	--	--	--	--	--	--	15	50	NA	NA	--	--	--	--	--	--
Uzbekistan	62,276	(25)	--	--	--	--	--	--	--	--	--	--	--	--	90	--
Total	258,000	1	53	10	265	39	15	50	350	(53)	94	11	30	11	1,430	(44)
Percentage of world total	10	--	2	8	8	37	1	--	26	(38)	54	11	19	21	8	(46)
Eastern and Central Europe:																
Albania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bosnia and Herzegovina	--	--	(4/)	--	(4/)	--	--	--	--	--	--	--	--	--	--	--
Bulgaria	1,100	(27)	15	(12)	60	--	10	(23)	--	--	--	--	--	--	25	25
Croatia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Czech Republic	--	--	--	--	--	--	15	(38)	--	--	--	--	--	--	--	--
Hungary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Macedonia	--	--	25	(4)	19	(37)	1	(80)	--	--	--	--	--	--	20	33
Poland	600	--	60	(51)	35	(30)	10	(33)	--	--	--	--	--	--	1,100	--
Romania	4,000	14	20	--	15	(25)	3	--	--	--	--	--	--	--	50	--
Serbia and Montenegro	1,200	(43)	9	200	1	(75)	--	--	--	--	(4/)	--	(4/)	--	8	(11)
Slovakia	300	(17)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Slovenia	--	--	--	--	--	--	15	--	--	--	--	--	--	--	--	--
Total	7,200	(11)	130	(31)	130	(21)	50	(28)	--	--	(4/)	--	(4/)	--	1,200	1
Percentage of world total	(4/)	(100)	4	(72)	4	(88)	2	(95)	--	(100)	--	--	--	--	7	(73)
Western Europe:																
European Free Trade Assosciation																
Iceland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Norway	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Switzerland	--	--	--	--	--	--	8	(20)	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	8	(20)	--	--	--	--	--	--	--	--

See footnotes at end of table.

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Metals--Continued															
			Lead						Mercury, mine output		Platinum-group metals				Silver, mine output	
					Refined 6/						Palladium		Platinum			
	Gold, mine output		Mine		Primary		Secondary									
Region and/or country	Quantity, (kilograms)	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/
Western Europe--Continued:																
European Union																
Austria	--	--	--	--	--	--	24	(4)	--	--	--	--	--	--	--	--
Belgium	--	--	--	--	98	18	20	--	--	--	--	--	--	--	--	--
Denmark and Greenland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Finland	5,000	67	--	--	--	--	--	--	45	13	(4/)	--	(4/)	--	24	(20)
France	2,632	(27)	--	--	100	(19)	158	2	--	--	--	--	--	--	1	--
Germany	--	--	--	--	210	24	205	--	--	--	--	--	--	--	--	--
Greece	--	--	14	(13)	--	--	--	--	--	--	--	--	--	--	37	(16)
Ireland	--	--	59	34	--	--	12	(8)	--	--	--	--	--	--	16	7
Italy	1,000	--	2	(67)	75	12	160	8	--	--	--	--	--	--	4	(60)
Luxembourg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands	--	--	--	--	--	--	20	--	--	--	--	--	--	--	--	--
Portugal	--	--	--	--	--	--	6	--	--	--	--	--	--	--	25	(7)
Spain	5,000	25	51	82	--	--	120	40	500	15	--	--	--	--	70	(27)
Sweden	6,000	36	108	(7)	38	--	48	45	--	--	--	--	--	--	300	--
United Kingdom	--	--	1	--	166	(10)	171	5	--	--	--	--	--	--	--	--
Total	20,000	31	235	11	700	3	940	6	545	15	(4/)	--	(4/)	--	500	(9)
Total, Western Europe	20,000	31	235	11	700	3	950	6	545	15	--	--	--	--	500	(9)
Percentage of world total	1	30	8	8	21	1	32	2	40	54	--	--	--	--	3	(12)
Total, Europe and Central Eurasia	290,000	2	420	(7)	1,100	6	1,000	4	895	(27)	94	11	30	11	3,100	(27)
Percentage of world total	11	2	13	(9)	33	4	35	--	66	(2)	54	11	19	21	17	(30)
United States	353,000	4	468	(10)	341	(3)	1,130	1	NA	NA	10	--	3	--	1,860	(5)
Percentage of world total	14	3	15	(12)	10	(4)	39	(3)	NA	NA	6	--	2	9	10	(8)
Total, world	2,550,000	(5/)	3,100	3	3,260	2	2,930	4	1,350	(25)	174	--	155	(8)	18,300	3

See footnotes at end of table.

TABLE 3--Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Metals--Continued															
	Tin						Titanium		Tungsten, mine output		Zinc					
	Mine		Smelter 6/								Mine		Smelter 6/			
			Primary		Secondary								Primary		Secondary	
Region and/or country	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Mine output, TiO2 content 7/	Metal, sponge	Quantity (metric tons)	Percent change 3/	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/
Central Eurasia:																
Armenia	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Azerbaijan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Belarus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Estonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Georgia	--	--	--	--	--	--	--	--	--	--	(4/)	--	--	--	--	--
Kazakhstan	--	--	--	--	--	--	--	8	--	--	322	12	260	4	--	--
Kyrgyzstan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Latvia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moldova	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Russia	5,000	11	4,700	119	500	25	--	30	3,500	--	136	3	230	2	--	--
Tajikistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turkmenistan	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ukraine	--	--	--	--	--	--	372	NA	--	--	--	--	--	--	--	--
Uzbekistan	--	--	--	--	--	--	--	--	--	(100)	--	--	18	(33)	--	--
Total	5,000	--	4,700	119	500	25	372	38	3,500	(5)	459	9	510	1	--	--
Percentage of world total	2	(8)	2	106	2	29	12	64	9	(21)	5	1	12	89	--	--
Eastern and Central Europe:																
Albania	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bosnia and Herzegovina	--	--	--	--	--	--	--	--	--	--	(4/)	--	--	--	--	--
Bulgaria	--	--	--	--	10	--	--	--	--	--	11	(8)	85	1	--	--
Croatia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Czech Republic	--	--	--	--	100	--	--	--	--	--	--	--	--	--	1	--
Hungary	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Macedonia	--	--	--	--	--	--	--	--	--	--	12	(40)	45	(6)	--	--
Poland	--	--	--	--	--	--	--	--	--	--	155	(17)	175	(2)	--	--
Romania	--	--	--	--	--	--	--	--	--	--	27	(4)	25	--	--	--
Serbia and Montenegro	--	--	--	--	--	--	--	--	--	--	3	(40)	8	167	--	--
Slovakia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--
Slovenia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	110	--	--	--	--	--	208	(17)	338	--	2	--
Percentage of world total	--	--	--	--	(5/)	--	--	--	--	--	2	(24)	8	86	1	(11)
Western Europe:																
European Free Trade Association																
Iceland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Norway	--	--	--	--	50	--	336	--	--	--	--	--	126	(5)	--	--
Switzerland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	50	--	336	--	--	--	--	--	126	(5)	--	--

See footnotes at end of table.

(Thousand metric tons, unless otherwise specified)

	Metals--Continued															
	Tin						Titanium		Tungsten, mine output		Zinc					
	Mine		Smelter 6/								Mine		Smelter 6/			
			Primary		Secondary								Primary		Secondary	
Region and/or country	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Quantity (metric tons)	Percent change 3/	Mine output, TiO2 content 7/	Metal, sponge	Quantity (metric tons)	Percent change 3/	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/	Quan-tity	Percent change 3/
Western Europe--Continued:																
European Union																
Austria	--	--	--	--	--	--	--	--	1,600	(1)	--	--	--	--	--	--
Belgium	--	--	--	--	8,500	240	--	--	--	--	--	--	252	9	28	--
Denmark and Greenland	--	--	--	--	100	--	--	--	--	--	--	--	--	--	--	--
Finland	--	--	--	--	--	--	--	--	--	--	16	(20)	223	(1)	--	--
France	--	--	--	--	3	--	--	--	--	--	--	--	348	5	--	--
Germany	--	--	--	--	--	--	--	--	--	--	--	--	325	20	70	--
Greece	--	--	--	--	150	(25)	--	--	--	--	17	(11)	--	--	--	--
Ireland	--	--	--	--	--	--	--	--	--	--	263	16	--	--	--	--
Italy	--	--	--	--	--	--	--	--	--	--	--	--	168	16	--	--
Luxembourg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands	--	--	--	--	--	--	--	--	--	--	--	--	215	(3)	--	--
Portugal	1,200	(52)	--	(100)	--	--	--	--	750	67	--	--	4	--	--	--
Spain	3	(89)	--	--	25	(50)	--	--	--	--	200	83	391	2	--	--
Sweden	--	--	--	--	--	--	--	--	--	--	176	1	--	--	--	--
United Kingdom	--	--	--	--	--	--	--	--	--	--	--	--	99	(26)	--	--
Total	1,200	(52)	--	(100)	8,800	208	--	--	2,400	14	700	22	2,025	4	100	--
Total, Western Europe	1,200	(52)	--	(100)	8,800	204	336	--	2,400	14	700	22	2,151	3	100	--
Percentage of world total	1	(60)	--	--	35	215	11	--	6	(5)	8	13	50	93	28	(11)
Total, Europe and Central Eurasia	6,200	(12)	4,700	109	9,400	177	708	38	5,900	2	1,400	10	3,000	3	100	--
Percentage of world total	3	(27)	2	97	38	186	23	64	16	(16)	15	1	69	91	29	(11)
United States	--	--	--	--	15,100	(8)	220	--	--	--	829	(2)	228	(5)	143	9
Percentage of world total	--	--	--	--	60	(4)	7	--	--	--	9	(9)	5	76	41	(3)
Total, world	238,000	20	258,000	6	25,000	(3)	3,020	59	37,400	20	8,730	9	4,340	(46)	348	13

See footnotes at end of table.

TABLE 3--Continued

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Industrial minerals													
			Diamonds											
	Cement, hydraulic		Natural 8/		Synthetic		Nitrogen		Phosphate rock		Potash, K2O equivalent		Salt	
Region and/or country	Quantity	Percent change 3/	Quantity (thousand carats)	Percent change 3/	Quantity (thousand carats)	Percent change 3/	Quantity (N content of ammonia)	Percent change 3/	Gross weight	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/
Central Eurasia:														
Armenia	219	(24)	--	--	--	--	--	--	--	--	--	--	30	11
Azerbaijan	200	--	--	--	--	--	--	--	--	--	--	--	4	--
Belarus	1,847	(8)	--	--	25,000	--	730	(3)	--	--	3,786	5	311	--
Estonia	329	(8)	--	--	--	--	128	(12)	--	--	--	--	--	--
Georgia	348	--	--	--	--	--	1	(99)	--	--	--	--	--	--
Kazakhstan	1,175	47	--	--	--	--	--	--	1,000	--	--	--	--	--
Kyrgyzstan	453	17	--	--	--	--	--	--	--	--	--	--	--	--
Latvia	W	NA	--	--	--	--	--	--	--	--	--	--	--	--
Lithuania	570	(14)	--	--	--	--	420	5	--	--	--	--	--	--
Moldova	222	344	--	--	--	--	--	--	--	--	--	--	--	--
Russia	32,400	14	23,200	1	80,000	--	8,735	14	11,500	158	3,700	(12)	3,200	60
Tajikistan	50	67	--	--	--	--	1	(90)	--	--	--	--	--	--
Turkmenistan	450	(5)	--	--	--	--	75	(6)	--	--	--	--	215	(2)
Ukraine	5,311	(9)	--	--	8,000	--	4,351	17	--	--	30	(14)	2,287	(9)
Uzbekistan	3,521	7	--	--	--	--	810	3	300	100	--	--	--	--
Total	47,100	9	23,200	1	113,000	--	15,250	12	12,800	128	7,500	(4)	6,000	18
Percentage of world total	3	7	20	--	46	89	14	12	10	142	30	(3)	3	16
Eastern and Central Europe:														
Albania	110	(27)	--	--	--	--	10	--	1	--	--	--	10	--
Bosnia and Herzegovina	300	--	--	--	--	--	1	--	--	--	--	--	50	--
Bulgaria	1,700	--	--	--	--	--	533	(47)	--	--	--	--	2,500	92
Croatia	2,852	5	--	--	--	--	325	2	--	--	--	--	20	11
Czech Republic	4,093	(7)	--	--	--	--	246	10	--	--	--	--	--	--
Hungary	3,000	1	--	--	--	--	352	41	--	--	--	--	--	--
Macedonia	585	13	--	--	--	--	--	--	--	--	--	--	--	--
Poland	14,807	(4)	--	--	--	--	1,862	62	--	--	--	--	4,200	23
Romania	8,264	32	--	--	--	--	1,016	48	--	--	--	--	2,070	(10)
Serbia and Montenegro	2,117	34	--	--	--	--	100	32	--	--	--	--	78	22
Slovakia	3,000	--	--	--	--	--	271	8	--	--	--	--	100	(16)
Slovenia	1,300	18	--	--	--	--	--	--	--	--	--	--	2	(60)
Total	42,000	5	--	--	--	--	4,700	19	1	--	--	--	9,000	24
Percentage of world total	3	3	--	--	--	--	4	19	(5/)	--	--	--	4	21
Western Europe:														
European Free Trade Assosciation														
Iceland	144	66	--	--	--	--	7	--	--	--	--	--	4	--
Norway	1,720	1	--	--	--	--	334	1,013	--	--	--	--	--	--
Switzerland	3,600	--	--	--	--	--	33	10	--	--	--	--	300	--
Total	5,500	1	--	--	--	--	374	523	--	--	--	--	300	--

See footnotes at end of table.

EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Industrial minerals													
			Diamonds											
	Cement, hydraulic		Natural 8/		Synthetic		Nitrogen		Phosphate rock		Potash, K2O equivalent		Salt	
Region and/or country	Quantity	Percent change 3/	Quantity (thousand carats)	Percent change 3/	Quantity (thousand carats)	Percent change 3/	Quantity (N content of ammonia)	Percent change 3/	Gross weight	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/
Western Europe--Continued:														
European Union														
Austria	3,900	3	--	--	--	--	450	--	--	--	--	--	401	--
Belgium	8,000	--	--	--	--	--	863	15	--	--	--	--	--	--
Denmark and Greenland	2,650	2	--	--	--	--	2	--	--	--	--	--	605	1
FInland	1,350	50	--	--	--	--	6	--	700	17	--	--	--	--
Finland	20,000	7	--	--	3,600	20	1,700	13	--	--	321	(8)	7,000	17
Germany	38,000	1	--	--	--	--	2,473	3	--	--	3,409	(4)	15,700	(1)
Greece	14,500	(3)	--	--	750	--	121	48	--	--	--	--	150	--
Ireland	2,000	--	--	--	60,000	--	410	2	--	--	--	--	--	--
Italy	36,000	6	--	--	--	--	408	11	--	--	--	--	3,600	(5)
Luxembourg	700	17	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands	3,200	--	--	--	--	--	2,543	5	--	--	--	--	5,000	--
Portugal	9,200	(2)	--	--	--	--	246	10	--	--	--	--	600	--
Spain	30,000	7	--	--	--	--	442	1	--	--	522	(20)	3,200	(11)
Sweden	2,150	2	--	--	20,000	(20)	--	--	--	--	--	--	--	--
United Kingdom	12,800	(1)	--	--	--	--	814	(10)	--	--	600	21	5,800	--
Total	184,000	3	--	--	84,000	(5)	10,500	5	700	17	4,900	(4)	42,100	1
Total, Western Europe	190,000	3	--	--	84,000	(5)	10,900	8	700	17	4,900	(4)	41,400	1
Percentage of world total	12	1	--	--	34	80	10	8	1	--	19	(3)	20	(2)
Total, Europe and Central Eurasia	280,000	4	23,200	1	197,000	(5)	31,000	12	13,500	117	12,400	(4)	57,000	5
Percentage of world total	17	2	20	--	80	79	28	12	10	131	49	(3)	27	3
United States	89,500	2	--	--	--	(100)	12,300	(13)	38,600	(5)	1,300	8	45,600	1
Percentage of world total	5	--	--	--	--	(100)	11	(13)	29	1	5	9	21	(1)
Total, world	1,640,000	2	118,000	1	247,000	(47)	109,000	(5/)	133,000	(6)	25,400	(1)	214,000	2

See footnotes at end of table.

TABLE 3--Continued
EUROPE AND CENTRAL EURASIA: PRODUCTION OF SELECTED MINERALS IN 2000 1/ 2/

(Thousand metric tons, unless otherwise specified)

	Industrial minerals--Continued		Mineral fuels													
			Coal						Natural gas				Uranium	
	Sulfur, all forms		Anthracite		Bituminous		Lignite				Petroleum, crude			
Region and/or country	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity (million cubic meters)	Percent change 3/	Quantity	Percent change 3/	Quantity (metric tons)	Percent change 3/
Central Eurasia:														
Armenia	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Azerbaijan	--	--	--	--	--	--	--	--	5,600	(6)	14,100	2	--	--
Belarus	20	(97)	--	--	--	--	--	--	257	(14)	1,841	--	--	--
Estonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Georgia	--	--	--	--	7	(30)	--	--	100	--	110	21	--	--
Kazakhstan	1,500	15	--	--	71,900	27	3,000	106	11,542	155	30,648	15	1,740	27
Kyrgyzstan	--	--	--	--	213	(17)	212	33	32	--	77	--	--	--
Latvia	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithuania	--	--	--	--	--	--	--	--	--	--	--	(100)	NA	NA
Moldova	--	--	--	--	40	25	--	--	--	--	--	--	--	--
Russia	5,900	32	1,050	(93)	172,060	4	83,740	--	584,000	(1)	325,000	7	2,000	--
Tajikistan	--	--	--	--	--	(100)	21	--	40	--	20	--	--	--
Turkmenistan	9	(10)	--	--	--	--	--	--	47,000	2,001	7,350	(6)	--	--
Ukraine	80	--	17,000	(5)	62,900	(4/)	1,067	(24)	17,847	900	3,693	(3)	500	--
Uzbekistan	460	1	--	--	80	38	2,480	(13)	55,600	(5/)	7,921	53	2,350	10
Total	8,000	14	18,000	(45)	307,200	7	91,000	1	722,000	9	391,000	7	7,000	10
Percentage of world total	14	14	5	(54)	9	5	11	(4)	33	19	11	5	16	(2)
Eastern and Central Europe:														
Albania	14	--	--	--	--	--	30	--	14,000	--	320,000	(1)	--	--
Bosnia and Herzegovina	1	--	--	--	--	--	1,800	--	--	--	--	--	--	--
Bulgaria	180	80	18	6	100	(97)	26,976	19	15	--	41	5	--	--
Croatia	15	--	--	--	--	(100)	--	--	1,768	25	1,768	9	--	--
Czech Republic	35	(13)	--	--	17,028	(1)	51,063	13	800	183	168	(5)	500	(18)
Hungary	30	--	--	--	725	(2)	13,080	671	3,000	(12)	1,136	(9)	10	--
Macedonia	15	150	--	--	--	--	7,000	(7)	--	--	--	--	--	--
Poland	1,699	13	--	(100)	103,331	769	59,484	(2)	4,956	(3)	653	54	--	--
Romania	65	5	14	--	--	(100)	29,279	35	14,577	929	6,038	(2)	50	(50)
Serbia and Montenegro	32	(68)	--	--	88	80	34,036	10	729	29	805	14	--	--
Slovakia	25	--	--	--	--	--	3,479	(7)	250	(12)	60	2	NA	NA
Slovenia	--	--	--	--	--	(100)	4,700	17	13	--	100	--	NA	NA
Total	2,110	11	32	(90)	121,300	226	231,000	15	40,000	222	330,800	(1)	560	(22)
Percentage of world total	4	11	(5/)	--	4	219	27	9	2	249	10	(3)	1	(31)
Western Europe:														
European Free Trade Assosciation														
Iceland	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Norway	115	(2)	--	--	330	32	--	--	42	(100)	140,000	(9)	--	--
Switzerland	3	(25)	--	--	--	--	--	--	--	--	--	--	NA	NA
Total	118	(2)	--	--	330	32	--	--	42	(100)	140,000	(9)	NA	NA

See footnotes at end of table.

(Thousand metric tons, unless otherwise specified)

Region and/or country	Industrial minerals--Continued		Mineral fuels											
	Sulfur, all forms		Coal						Natural gas		Petroleum, crude		Uranium	
			Anthracite		Bituminous		Lignite							
	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity	Percent change 3/	Quantity (million cubic meters)	Percent change 3/	Quantity	Percent change 3/	Quantity (metric tons)	Percent change 3/
Western Europe--Continued:														
European Union														
Austria	9	(84)	--	--	--	--	1,100	(3)	1,800	6	1,078	--	--	--
Belgium	410	37	--	--	--	(100)	--	--	375	--	--	--	--	--
Denmark and Greenland	11	10	--	--	--	--	--	--	--	(100)	11,900	1	--	--
Finland	850	1	--	--	--	--	--	--	--	--	--	--	NA	NA
France	1,110	35	200	(53)	3,166	(33)	297	(58)	2,600	31	1,887	1	319	(27)
Germany	1,240	2	1,300	(67)	36,000	(10)	168,051	4	22,000	(5)	3,172	15	40	21
Greece	78	8	--	--	--	--	62,000	7	40	--	476	--	--	--
Ireland	--	--	--	--	--	--	--	--	2,500	77	--	--	--	--
Italy	693	2	--	--	--	--	50	(17)	18,500	5	4,900	2	--	--
Luxembourg	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Netherlands	512	(12)	--	--	--	--	--	--	70,000	(7)	2,800	5	NA	NA
Portugal	30	275	--	--	--	--	--	--	125	--	--	--	10	--
Spain	685	(28)	4,651	(14)	6,681	6	12,153	(3)	179	--	238	(26)	251	(2)
Sweden	151	26	--	--	--	--	--	--	4,000	--	--	--	NA	NA
United Kingdom	191	(5)	797	(20)	31,175	(14)	--	--	105,000	6	124,079	(8)	NA	NA
Total	5,970	2	6,900	(36)	77,000	(12)	243,700	4	230,000	(5/)	105,500	(6)	620	(16)
Total, Western Europe	6,090	2	6,900	(36)	77,000	(12)	243,700	4	230,000	(18)	290,500	(8)	620	(16)
Percentage of world total	11	2	2	(46)	2	(14)	28	(2)	10	(11)	8	(9)	2	(25)
Total, Europe and Central Eurasia	16,000	9	25,000	(43)	506,000	23	566,000	8	990,000	4	1,012,000	--	8,000	4
Percentage of world total	28	8	7	(52)	15	20	66	2	45	13	30	(2)	19	--
United States	10,300	(9)	4,150	(11)	892,000	(3)	77,600	1	548,000	4	298,200	(1)	1,720	(19)
Percentage of world total	18	(9)	1	(25)	27	(5)	9	(4)	25	13	9	(3)	4	(28)
Total, world	57,200	(5/)	351,000	18	3,270,000	2	857,000	6	2,210,000	(8)	3,430,000	2	41,000	12

NA Not available. W Withheld to avoid disclosing proprietary data; not included in region and world totals. -- Zero.

1/ Some of the individual entries in this table may differ from those appearing in individual country production tables elsewhere in this volume owing to the inclusion in this table of data received at a later date. Percentages in parentheses are negative in value.

2/ U.S. data and world totals are rounded to no more than three significant digits.

3/ Percent change is calculated, for each region and/or country, by taking 100 times the difference of the current year's data over last year's data minus 100.

4/ Less than 1/2 unit.

5/ Less than 1% but greater than 0%.

6/ Primary production also includes undifferentiated (primary and secondary) production for those countries listed.

7/ Includes ilmenite, rutile, and titaniferous slag.

8/ Includes gem and industrial diamonds.

THE MINERAL INDUSTRIES OF THE

ADRIATIC BALKANS—ALBANIA, BOSNIA AND HERZEGOVINA, CROATIA, MACEDONIA, SERBIA AND MONTENEGRO, AND SLOVENIA

By Walter G. Steblez

Europe's Adriatic Balkan region is part of the southern portion of the Mediterranean Alpine folded zone, which extends through the Dinarides of the former Yugoslavia (Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Montenegro, and Slovenia), the Albanides of Albania, and the Hellenides of Greece. The exploitation of the Bor copper deposit in Serbia may have had prehistoric beginnings; however, mining for base and precious metals may be traced through historical records to at least the 5th century BC.

More recently (from the 1930s to 2000), mineral deposits in the region became better defined. Commercial resources of major base metals included those of aluminum, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, and zinc. Precious metals (gold, silver, palladium, and platinum) were found mainly in association with such base metals as copper, lead, and zinc. Industrial minerals are represented by a broad range of carbonate and silicate rocks, clays, gravels and sands, and volcanic material. Mineral fuels included coal (lignite), natural gas, and petroleum.

Until the early 1990s, the mining, processing, and downstream exploitation of base metals established the region as a major European source of copper, lead, and zinc and a major world producer of chromite. The transition of the region from central economic planning to market economy systems from 1991 to 2000, however, began a swift deconstruction of existing political, commercial, and social structures. The ensuing political, social, and ethnic tensions and conflicts destroyed or degraded much of the region's mineral industries and industrial infrastructure. In 2000, active conflict in the region centered in Kosovo Province in Serbia and Montenegro and in Macedonia.

The future status of the minerals industries in the countries of the Adriatic Balkan region will only be clarified following political settlement and normalization not only between the states in the region, but also within Bosnia and Herzegovina, Croatia, Macedonia, and Serbia and Montenegro.

ALBANIA

In 2000, Albania continued to make progress toward fully developing a market economy system. The country's gross domestic product (GDP) grew by 7.8% compared with that of 1999. This was the third year of sustained economic growth, following a major downturn in 1997 that was caused partly by internal economic issues related to Albania's transition to a market economy and partly by regional instability, especially in the neighboring republics of the former Yugoslavia.

Mineral deposits that traditionally are associated with Albania include chromite, copper ore, and nickeliferous iron ore, as well as natural gas and petroleum. In 2000, with the exception of nickeliferous iron ore, these deposits and such other minerals as bauxite, phosphate rock, dolomite, gypsum, and marble have been intermittently worked. Only chromite, copper, gas, and oil, which are minerals of major commercial importance, have shown sustained exploitation.

Under the central economic planning system, especially from the late 1970s through 1990, Albania's chromite mining operations were among the more important components of the mineral industry. During this period, Albania was a leading world producer and exporter of chromite; the country often was ranked second in terms of export and third in terms of production. During this period, exports of chromite, ferrochromium, and petroleum refinery products constituted the country's chief sources of foreign exchange.

For much of the 1990s, Albania's chromite mining and processing industry generally paralleled the moribund performance of the country's economy. Mine production, which amounted to more than 1 million metric tons per year (Mt/yr) of chromite in the 1980s, declined to 236,000 metric tons (t) by 1995, and fell to 79,445 t in 1999. Following several years of unsuccessful searches for foreign partners to invest in the chromite mining and processing industry, in 2000, the Government of Albania awarded Hayri Ogelman Madencilik of Turkey a long-term concession to upgrade and operate the Kalimash mining and beneficiation complex and, in addition, to develop mines at the Perollajt and Vllahane deposits in the northeastern part of the country. Hayri Ogelman Madencilik also planned to invest about $40 million in these projects as well as for the construction of a new ferrochromium plant in Elbasan (European Bank for Reconstruction and Development, 2001a, p. 17).

The existing ferrochromium plant at Elbasan came under operational management of ferrochromium producer, Darfo S.p.A. of Italy because of a long-term, 30-year concession agreement with the Government of Albania (European Bank for Reconstruction and Development, 2001a, p. 17). The agreement also gave Darfo the right to operate the Pojska and the Prrenjas chromite mines; the Pojska Mine had not produced since 1996, and the Prrenjas Mine last reported production in 1998 (980 t). Darfo's investment plan would amount to $15 million, of which $14.5 million was earmarked for modernization of the Elbasan ferrochromium plant and $0.5 million was to be invested in the Pojska and the Prrenjas Mines. Darfo sought a second concession to operate the Bulqiza mining and beneficiation complex.

In 2000, the Turkish copper smelting concern, Ber-Ober Madencilik San ve Tic As (Ber-Ober), was granted a 30-year concession to operate Albania's copper industry on a build-operate-transfer basis. The concession included mines and processing facilities in the Lezhe, Midrite, and Puke Districts. Ber-Ober planned to invest about $24.5 million in Albania's copper industry (European Bank for Reconstruction and Development, 2001a, p. 17).

Between 1994 and 1996, there was a hiatus of steel production at the Elbasan steelworks, which virtually had been abandoned during the 1990s. Some production resumed in 1997, 1998, and 1999, which amounted to 20,533 t, 19,527 t, and 4,813 t, respectively. In 1999, operations and management at Elbasan came under control of Kurum Steel Co. of Turkey under a 20-year lease agreement with the Government of Albania. By the beginning of 2000, production at Elbasan had risen to more than 10,000 metric tons per month from less than 10,000 metric tons per year (t/yr) (European Bank for Reconstruction and Development, 2001, p. 18). In 2000, Kurum's operations at Elbasan were based on two 15-t electric arc furnaces, a third electric arc furnace being converted to a ladle furnace, and one ladle furnace. In addition, Kurum operated a 250,000-t/yr billet caster, a 20,000-t/yr medium sections mill, a 180,000-t/yr bar and 30,000-t/yr wire rod mill, and a 10,000-t/yr merchant bar mill. Total finished carbon steel capacity at Elbasan in 2000 was 240,000 t/yr. Scrap steel raw materials were imported from Turkey and Ukraine. Target markets included Kosovo (Ayers, 2000).

The privatization and sale of the Fushe-Kruje cement plant for $12.5 million in April was among the major events in the industrial minerals sector during the year (European Bank for Reconstruction and Development, 2001a, p. 12, 15). The plant reportedly had production capacity of 150,000 t/yr of cement. The new owner RMC-ECF (a United Kingdom-Lebanese consortium) instituted an investment program to raise the capacity to meet 45% of domestic needs, thereby reducing imports. Recent cement output has not exceeded the 243,000 t produced in 1995, and imports have ranged from 500,000 to 600,000 t/yr. Facility expansion was expected to be completed in 2001. In 1997, the Lebanon-based cement trading and producing concern Seament Holding S.A.L. acquired a 70% stake in the Elbasan Cement Factory and 70% in United Quarries, which operated an adjacent limestone quarry. Facility expansion also was planned at the Elbasan plant, which would include the installation of a new 500,000-t/yr dry process clinker kiln. The project would include the possible participation of the European Bank for Reconstruction and Development; financing could range between $15 million and $18 million (European Bank for Reconstruction and Development, 2001a, p. 12, 15).

Albania's energy production was based on coal, hydropower, natural gas, and petroleum production. The output of such mineral fuels as natural gas and petroleum, however, was central to the country's future developmental plans. The country's reported recoverable reserves of petroleum amounted to about 550 million metric tons. The state petroleum- and natural-gas-producing company Albpetrol Ltd. was reorganized in 1999 into three commercial companies—APC (the new official designation of Albpetrol), which was in charge of petroleum production; Servcom Sh.A., which was in charge of handling services; and Armo, which was in charge of refining and marketing (European Bank for Reconstruction and Development, 2001a, p. 17). With the participation of the World Bank and the Government of Italy, Armo was the first to be privatized in 2001. Most of the Albania's petroleum was extracted at Berat and Fier in the south-central and southwestern parts of the country, respectively. The major refineries were at Ballsh, which had capacity of 1 Mt/yr, and at Fier, which had capacity of about one-half that of Ballsh. The Ballsh refinery indicated plans to start the production of lead-free refined gasoline in 2001. Three other refineries with a cumulative capacity of 1 Mt/yr were capable only of primary processing.

Another major activity in the petroleum sector involved a memorandum of understanding that was signed during the year relative to the construction of a trans-Balkan pipeline that would extend from Burgas on the coast of Bulgaria through the city of Skopje in Macedonia to the port of Vlore in Albania. The Burgas Vlore Pipeline was projected to be about 913 kilometers long and have a total cost of $1.13 billion. The pipeline would be built and operated by the U.S.-based consortium Albanian, Macedonian, and Bulgarian Oil Corp. Financing would be based on bank credits from international financial institutions (about $60 million), and the balance, from the sale of company shares. Construction was scheduled to start in 2001 and to be completed in 2005. The pipeline was intended to carry 750,000 barrels per day of petroleum from Russia and other states of the former Soviet Union from the Black Sea to western European markets.

BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina's mineral resources with associated mining and processing facilities remained divided within the country's two administrative zones—the Federation of Bosnian Moslems and Croatians (FBC), which formed one entity (about 51% of Bosnia and Herzegovina), and the Republika Srpska (RS) with a predominantly Serbian population, which formed the other entity (49%). In 2000, the process of reintegrating the two zones continued to show little progress.

The economy of Bosnia and Herzegovina continued to be difficult to gauge owing to the lack of uniform reporting by each side to the Agency for Statistics in Sarajevo. The growth rate of the country's GDP for 1999, which continued to be driven by transfers from abroad and by capital inflows, was revised to 7% from the 10% reported earlier (Central Bank of Bosnia and Herzegovina, 2000, p. 36). A similar GDP growth rate in 2000 was expected but would be contingent on continued financial assistance from the international community, which continued to focus its efforts on the development of a market economy and the reconstruction of Bosnia and Herzegovina's postwar industry and infrastructure (U.S. Agency for International Development, 2000a).

Industrial production in the FBC rose by 8.8% in 2000 compared with that of 1999. The energy sector, which represented about 35% of the value of industrial output (coal production and electric power), accounted for most of this increase. Overall, mining output, which accounted for more than 10% of total industrial production, rose by about 10.4% in 2000 compared with that of 1999. In the FBC, coal was produced in the Tuzla and the Zenica regions with most of the output earmarked for the Kakanj and the Tuzla powerplants. The FBC accounted for about 80% of total resources of brown coal and for about 60% of the lignite in Bosnia and Herzegovina. Bauxite and alumina were produced in the southern and western areas of the FBC, and aluminum was smelted in Mostar. Lead and zinc ore has been produced at Olovo and Vares, but the mining status of these operations was uncertain in 2000. Iron ore production was centered at Jablanica and Vares, and that of manganese ore, at Bosanska Krupa.

The FBC was the only producer of steel in Bosnia and Herzegovina. BH Steel Co. Zenica produced pig iron and carbon steel; additional cold-rolled steel and pipe was produced at Unis in Sarajevo. In 2000, major activities in the steel sector included a contract awarded to Danieli SpA of Italy by BH Steel to supply a new 100-t electric arc furnace and to modernize an existing light section mill.

The FBC also had exploitable resources of barite, gypsum, magnesite, and rock salt. The levels of output of these as well as other mineral commodities, however, were not fully clear in 2000.

In the RS, industrial production increased by 5.6% in 2000 compared with that of 1999. The increase was buoyed largely by an 8.6% increase in the output of raw materials, of which nonferrous metals and base chemicals reportedly recorded the largest increase in production (Köhl, 2001). All branches of the minerals industry (mining to semimanufactures), however, represented about 20% of total industrial output.

Bauxite deposits of regional importance were worked at Vlasenica and Zvornik in the eastern RS and near Banja Luka in the northwestern RS. Although the RS was not a producer of aluminum, alumina was refined at Zvornik for export. Lead and zinc were mined at Srebrenica. Substantial deposits of nickel also had been worked at the Vardiste Mines near Visegrad. Although complete data on mineral production have been scarce, the latest data (1998) on capacity utilization suggest a low level of production within the minerals industry sector of the RS. In ferrous metals mining and beneficiation, nonferrous metals mining, and nonferrous metals production, capacity utilization amounted to about 20%, 5%, and 8%, respectively. Capacity utilization for total downstream metalworking amounted to about 61%. Capacity utilization in industrial minerals mining and processing had fallen to about 14% and 3%, respectively. In the cement, concrete, and sand production branches, capacity utilization amounted to 24%. Coal production and petroleum-refining branches reported having attained capacity utilization levels of 59% and 26%, respectively (U.S. Agency for International Development, 2000b, p. 48-54).

The modernization and privatization of the mineral industries in both halves of Bosnia and Herzegovina as well as the establishment of reliable markets continue to be essential for their long-term viability.

CROATIA

Petroleum production and refining remained the chief components of Croatia's minerals industry. Small quantities of ferrous and nonferrous metals and industrial minerals were produced, mainly for domestic needs.

In 2000, following a year of economic stagnation, Croatia's GDP grew by 3.5%, and industrial production, by about 1.7%. The total value of output of the mining and quarrying sector increased by 1.8%, of which the value of petroleum output increased by 2%. The output of petroleum refinery products, base metals, and processed industrial minerals rose by 5.4%, 4.4%, and 4.1%, respectively.

Major activities in the oil and gas sector included the Government's plan to privatize Croatia's state-owned oil company Industrija Nafte d.d. Zagreb (INA) in 2002. INA operated domestic oilfields and gasfields southeast of Zagreb near the Hungarian border and along the Adriatic coast. The country's primary source of petroleum came from imports via the Adria pipeline that runs from Omisalj on the Adriatic coast toward Sisak (refinery) to the east and then northward towards Hungary. About two-thirds of the crude oil consumed by Croatia was imported from oilfields that INA operated under contract in Angola, Egypt, and Russia. New offshore Adriatic deposits were under development and exploitation through a joint venture with ENI of Italy (European Bank for Reconstruction and Development, 2001, p. 13). Also, INA's Sisak refinery began to ship petroleum refinery products to Serbia and Montenegro in October shortly after the cancellation of the international embargo. Other developments involved Jadranski Naftovod, d.d. Zagreb (JANAF), in which INA held a 38% stake. In October, JANAF and Russia concluded an agreement that called for Yukos of Russia to participate in the modernization of the Adria pipeline and its linkage with Yukos's Druzhba pipeline, which supplies Central Europe with petroleum. The project would allow Yukos to transport crude petroleum to the port of Omisajl in Croatia for loading onto tankers (European Bank for Reconstruction and Development, 2001b, p. 13).

Croatia's production of metals was based mainly on domestic and imported secondary raw materials. With the exception of crude steel, the output of which fell by nearly 8%, the production of aluminum semimanufactures (output of primary aluminum declined slightly) and ferroalloys registered recovery in 2000. Ferroalloy (ferrochromium) production resumed following a break in output in 1999.

Jadranska Zelejzara Split on the Adriatic coast and SP MK Zeljezare Sisak d.d. in Sisak composed the country's steel industry. Major activities in the iron and steel industry in 2000 included a contract Jadranska awarded to Voest Alpine Industrieanlagenbau of Austria to modernize Jadranska's operations. The renovation of Jadranska would cost about $10 million and include the installation of a new electric arc furnace, a two-stand Concast billet caster, and a rolling mill. The new electric arc furnace, which would replace two older furnaces, was scheduled for startup in September 2001 and would have a design capacity of 81,000 t/yr. Total steel production capacity at Jadranska was to be about 170,000 t/yr (Metal Bulletin, 2000a). Other issues in the steel industry involved the European Union's (EU) imposition of a definitive 23% duty on imports of Croatian seamless pipe and tube in response to findings of dumping by the European Commission. This measure replaced the imposition of a provisional 31.2% duty by the EU in 1999 (Burgert, 2000).

There was a rise in output in the industrial minerals sector. The cement industry, which helped drive the quarrying of industrial minerals used in construction saw production increase by more than 3% compared with that of 1999. Foreign investment by a United Kingdom-based consortium in Dalmacija Cement, which amounted to $48.01 million, mainly was earmarked to convert operations from fuel oil to coal and petroleum-based coke.

The outlook for Croatia's economy and minerals industry, as well as for that of the other republics of the former Yugoslavia, is captive to political and social stabilization in the region.

MACEDONIA

The Former Yugoslav Republic of Macedonia (Macedonia) showed strong recovery from the economic downturn that followed the Kosovo conflict of 1999. The GDP increased by 5.1% compared with that of 1999. The industrial minerals and construction material branches of industry were major contributors to this rebound, which mainly was caused by demand generated by reconstruction efforts in neighboring Kosovo. Freer access to markets in the EU also helped improve the country's economic performance in 2000 (European Bank for Reconstruction and Development, 2001, p. 2-5). In 2000, industry and mining accounted for 21.1% of Macedonia's GDP. Compared with that of 1999, the increase in the total value of industrial production exceeded 5%, of which the output of coal, iron and steel, nonferrous ores and metals, and construction materials accounted for 2.1%, 4.3%, 4.8%, and 5.1% respectively (European Bank for Reconstruction and Development, 2001, p. 12).

The Government of Macedonia remained committed to developing the country's market economy system as well as promoting foreign investment. In 2000, foreign investment was represented almost in all branches of the minerals industry.

Macedonia produced a range of metals that included copper, ferroalloys, lead, silver, steel products, and zinc. The country's secondary aluminum industry centered on Alumina A.D. in Skopje, which had the capacity to produce 20,000 t/yr of billets and 12,000 t/yr of semimanufactures. The denationalization of major enterprises in the metals branch had important results during the year. The Skopje-based Feni-Rudnici i Industrija za Nikel, Celik i Antimon (FENI), which produced mainly ferronickel, was acquired by Societe Commerciale de Metaux et Mineraux (SCMM) of France for $2.25 million. FENI was 1 of 12 loss-making Macedonian enterprises that were determined to be suitable for closure or sale by the International Monetary Fund. Earlier in the year, Glencore International AG of Switzerland and other commercial enterprises had conducted negotiations with the Government to purchase FENI, which did not prove successful. The terms of SCMM's acquisition of FENI included a purchase price of $2.25 million and a commitment to invest a further $36 million in FENI's operation (Cahners Business Information, 2000; Hope, 2000). The Government of Macedonia also sold 82% of shares of the country's principal mine producer of copper Bucim, Rabotna Organiziacija za Rudarstvo i Metalurgija za Baker's (Bucim) (246,270 shares at $6.06 per share) through the Macedonian Stock Exchange. Bucim operated a mine and mill near Radovis. Other enterprises that were slated for sale or closure included ferroalloy producer Jugohrom, Hemijsko-Elektrometalurski Kombinat and the lead and zinc mining, beneficiation, and smelting complex Prepobotuvacki, Kombinat Zletovo-Sasa (Hope, 2000). Steel was produced at AD Makstil (a subsidiary of Duferco). Duferco had made investments that included upgrading the steel plant's continuous casters and electric arc furnaces and the installation of a ladle furnace. In 2000, Makstil reported that the production of heavy plate exceeded 240,000 t.

Macedonia also produced such industrial minerals as bentonite, feldspar, gypsum, sand and gravel, and stone (carbonate and silicate), as well as cement and other construction materials that were based on domestic quarried products. About 20% of mine output of industrial minerals was consumed domestically; the balance was exported mainly to other Balkan countries, the EU, and Russia. In 2000, important activities in this branch, including its downstream construction materials group, included a planned sale of Mermeren Kombinat Prilep, which was the country's largest producer of marble, to I. Kiriakidis S.A. of Drama, Greece. The Cyprus-based consortium Balkcem Ltd. (comprising Titan Cement S.A. of Greece and Holderbank Group of Switzerland) invested $30.7 million in A.D. Cementarnica USJE (USJE) for facility modernization to reduce costs and to increase environmental protection. To help achieve the latter, Balkcem, which had acquired 86.4% of USJE's shares in 1998, planned to discontinue USJE's production of asbestos and asbestos cement in 2001 (Multilateral Investment Guarantee Agency, 2000).

Coal and petroleum constituted about 52% and 15%, respectively, of total fuel sources at electric power generators. Most coal (lignite) was from domestic mining; however, all natural gas and petroleum had to be imported. Major foreign investment in the energy sector was accomplished in late 1999 with the purchase of OKTA A.D., Macedonia's sole petroleum refinery. In addition to the $32 million purchase price, Hellenic Petroleum S.A. indicated that it would allocate an additional $40 million for the modernization of the refinery. In December, the European Bank for Reconstruction and Development indicated approval of a $50 million loan to help finance the Thessaloniki-Skopje crude petroleum pipeline. The proposed pipeline, which would carry 2.5 Mt/yr of petroleum, was expected to reduce transportation costs of petroleum to Macedonia. Additionally, the proposed pipeline, which would extend from the Greek port of Thessaloniki to its OKTA terminus, was considered to be a better environmental alternative to the existing rail and trucking petroleum delivery route that follows the Vardar River, which also is a wildlife habitat (European Bank for Reconstruction and Development, 2001, p. 17).

SERBIA AND MONTENEGRO

Serbia and Montenegro began the year facing a major effort to rebuild roads, electric power stations, steel mills, and other industrial plants and infrastructure that had been heavily damaged during the Kosovo conflict of 1999. Additionally, bridges that had been destroyed by the North Atlantic Treaty Organization (NATO) air campaign remained effective obstacles to normal international freight traffic, which included a significant amount of mineral raw materials, on the Danube River.

Despite continuing economic sanctions imposed by the international community and the loss of effective political and economic control of Kosovo (with resources of nickel, lead, and zinc ores, coal, and production facilities for lead and zinc, ferronickel, and tin-plate, as well as a substantial portion of lignite-producing mines), the economy of Serbia and Montenegro rebounded from the sharp decline of 18% in the GDP in 1999. In 2000, the country's GDP rose by 7%, and industrial production, by 12% compared with those of 1999 (Serbia and Montenegro Federal Statistical Office, 2001, p. 4).

The yearend results of the minerals industry generally showed improvement in performance compared with those of 1999. The value of output levels attained in 2000 in the mineral fuels branch showed increases of 8%, 11%, and 6% for coal, oil and gas, and oil derivatives, respectively; iron and steel, industrial (nonmetallic) minerals, and nonferrous metals branches recorded 152%, 38%, and 7% increases in output, respectively, compared with 1999 production levels (Serbia and Montenegro Federal Statistical Office, 2001, p. 4). A comparison of output with prewar mineral production levels achieved in 1998, however, underscores a far less than full recovery.

The gross weight of mine output of lead and zinc and copper ores was 52% and 35%, respectively, below respective output levels achieved in 1998; the production of refined lead, silver, copper, and zinc, fell short by 95%, 78%, 52%, and 42%, respectively. In the nonferrous metals branch, only alumina, aluminum, and bauxite operations, which are in Montenegro, registered substantial gains compared with 1998 in terms of physical production levels, largely because of favorable treatment that was accorded to Montenegro's economy by the European Commission. Aluminum, alumina, and aluminum hydroxide were the only products that would be allowed entry into the EU from Serbia and Montenegro duty free (Metal Bulletin, 2000c). To meet prospective export opportunities, Montenegro's Podgorica smelter (managed by Glencore) announced plans to decrease idle capacity at the plant and to lower production costs (Reuters Ltd., 2000a). Such subsidiary semimanufacturing operations as rolling mills, casting plants, and other similar facilities were to be offered for sale during the year (Metal Bulletin, 2000b).

Exports of most nonferrous metals and nonferrous metal semimanufactures registered increases in 2000, albeit not at the levels of aluminum and its alloys. Major issues in the nonferrous metals industry remained centered on the Bor and the Trepca mining, beneficiation, smelting, and refining complexes for copper and lead and zinc, respectively. Rudarsko Topionicki Bazen's Bor mining, beneficiation, and smelting complex, which accounted for all of Serbia and Montenegro's mine, smelter, and refinery output of copper production, was the subject of domestic and international scrutiny and concern about the alleged smuggling of gold recovered from copper mining to foreign metals markets (Smith, 2001). Kosovo-based Rudarsko-Metalursko-Hemijski Kombinat za Olovo i Cink Trepca (Trepca), which had operated only the lead plant fed by stockpiled concentrates since resuming operation in July 1999, was seized by NATO forces. According to NATO spokespersons, the objective of the seizure was to bring the smelter into compliance with environmental regulations (Mining Journal, 2000; Reuter Ltd., 2000b). NATO authorities, however, promised to keep and pay the Trepca workforce at their current (2000) salary levels despite a modernization program that could take several years (Maguire, 2000). Trepca also had been a producer of such associated metals as antimony, bismuth, cadmium, gold, and silver.

The gross weight production, in order of processing, of crude steel, pig iron, and steel semimanufactures fell short of their 1998 production levels by 28%, 32%, and 58%, respectively. In 2000, the Yugoslav Iron and Steel Federation commissioned Usinor Consultants of France to study ways to raise the competitiveness of Serbia and Montenegro's steel industry. As part of an overall rationalization strategy, Usinor urged a rapid privatization of the Sartid AD Smederevo integrated steel mill in Serbia and Zeljezra Niksic AD in Montenegro. Near-term plans for facility expansion at Sartid also included the installation of a 150,000-t/yr galvanizing line and a new continuous caster, as well as a pulverized coal injection system in the No. 2 blast furnace. Plans at Zeljezara Niksic included the installation of a new electric arc furnace, a new continuous casting unit, and a new ladle furnace.

The situation for industrial and mineral fuels was not dissimilar to that of the metals; most commodities in 2000 were substantially below their 1998 output levels, with the exception of bentonite, brown coal, gypsum, lime, quartz sand, and salt, which showed increases. A negotiated lease by the United Nations Interim Administration Mission in Kosovo of the Sharr cement plant (near the Macedonian border) to Holderbank Financière Glaris Ltd. was one of the salient events in the industrial minerals branch. Under the terms of the lease, Holderbank would invest about $16.4 million in the Sharr cement plant to modernize production and to institute environmental protection and health and safety standards. The full operation of the 600,000-t/yr Sharr cement plant and attendant quarries, whose production included clay, limestone, and marl, also would help stabilize employment in the region.

At yearend, striking coal miners in Serbia helped bring about a recognition of election results by the Government. Political and economic stability in the region, however, appears to be a long-term prospect.

SLOVENIA

Slovenia's minerals industry produced a modest range and minor quantities of mineral commodities that included coal, natural gas, petroleum, and a variety of industrial minerals. The country relied heavily on imports of fossil fuels, ferrous and nonferrous ores and metals, and other mining and quarrying products.

With well-developed systems of transportation and modern telecommunications, Slovenia had one of the more technically advanced industrial bases of the republics of the former Yugoslavia. Chemicals, electronics and telecommunications, and retail were the sectors with highest rates of growth (European Bank for Reconstruction and Development, 2001, p. 3). In 2000, the performance of the country's economy remained positive, given the increase in the GDP of 4.25% compared with that of 1999; the total value of industrial production rose by 6.2%. The output and fabrication of metals showed combined gains in excess of 12%. The mining and quarrying share of industrial output, however, declined by 2.7%, as did that of industrial mineral products, which declined by 3.6%. Also, a substantial decline of production of processed mineral fuels (primarily coke and petroleum refinery products) was noted.

With the exception of nonferrous metals, whose value of imports continued to match that of exports, Slovenia depended heavily on imports for almost all mineral commodities. According to the latest available trade data (1999), this dependency, valued in U.S. dollars, increased for most commodity groups in 1999 compared with that of 1998. In 1999, the net value of imports of gold (nonmonetary), metal ores and scrap, and iron and steel increased by 70%, 11.5%, and 1.2%, respectively. Net imports of industrial mineral goods rose by about 5.7%. With respect to mineral fuels, the combined net import value of coal, coal briquettes, and coke increased by about 63%, but that of crude and refined petroleum declined by about 17% compared with those of 1998 (Statistical Office of the Republic of Slovenia, 2000, p. 390-391).

The Government continued to promote the country's transition process to a market economy system. The Energy Act was adopted in 1999 to promote privatization and stimulate foreign investment in the energy sector. Major activities in the energy sector included a program of modernization at the Krsko nuclear powerplant, which Slovenia jointly owns and operates with neighboring Croatia (European Bank for Reconstruction and Development, 2001, p. 14).

In 2000, salient activities in the steel industry included the addition of a new automated quality inspection line at INEXA Store Ltd., which was valued at $1.2 million.[1] INEXA also planned to modernize the plant's rolling mills. SZ Jeklo Store d.o.o. was privatized in 1999 and acquired by INEXA Group of Sweden. Additionally, a new forging line was added at the SZ Ravne d.o.o. steel mill; the new line replaced an older unit to produce bar sections, flat sections, and other products from all grades of steel.

Important activities in the nonferrous metals industry included the planned facility expansion at Slovenia's aluminum smelter Kidricevo Talum d.o.o. that would increase production capacity to about 155,000 t of primary and secondary aluminum by 2002 from about 100,000 t in 2000. Talum obtained outside financing for the project (a new pot room) that amounted to $76 million in addition to its own capital. Talum also planned to produce 117,000 t of aluminum in 2001 (European Bank for Reconstruction and Development, 2001, p. 14).

Cement, clays, dimension stone, and silica products were among the industrial minerals produced in Slovenia. Consumption of cement and other construction materials continued to increase, which, in turn, would further increase demand for other industrial minerals as well as for steel and other base metals. If Slovenia should join the EU, then this trend may well accelerate with developmental emphasis being placed on rail and road infrastructure.

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[1] Where necessary, values have been converted from German deutsche marks (DM) to U.S. dollars (US$) at the rate of DM1.00=US$0.48.

TABLE 1
ADRIATIC BALKANS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
ALBANIA 3/						
Metals:						
Bauxite		--	4,454	4,128	4,624	5,000 e/
Chromium:						
Chromite, gross weight	thousand tons	236,358	157,203	150,285	79,445	80,000 e/
Marketable ore	do.	113,361	84,423	81,994	64,597	65,000 e/
Concentrate	do.	30,402	21,881	20,195	6,837	5,000 e/
Ferrochromium	do.	31,189	31,144	30,252	28,120	25,000 e/
Copper:						
Ore:						
Gross weight	do.	187,765	24,895	53,477	33,945	35,000 e/
Concentrate		10,807	869	2,294	8,691	9,000 e/
Cu content e/		2,500	220	3,200	900 r/	900
Metal, primary:						
Smelter (blister)		1,424	--	1,632	1,281	1,300 e/
Refined		1,544	--	1,150	342	350 e/
Iron and steel, metal:						
Pig iron e/		10,000	10,000	10,000	10,000	10,000
Crude steel		-- r/	20,533 r/	19,527 r/	4,913 r/	180,000 e/
Rolled steel		--	43,000	42,000	8,700	170,000 e/
Industrial minerals:						
Cement, hydraulic e/	thousand tons	200	150	150	150	200
Clay, kaolin e/		500	500	500	500	500
Dolomite e/		50,000	50,000	50,000	50,000	50,000
Fertilizer, manufactured:						
Phosphatic		--	26,604	12,284	8,600	9,000 e/
Urea e/		3,000	3,000	3,000	3,000	3,000
Nitrogen, N content of ammonia e/		15,000	10,000 r/	10,000 r/	10,000 r/	10,000
Olivinite e/		300	300	300	300	200
Phosphate rock (12%-15% P_2O_5) e/		1,000	1,000	1,000	1,000	1,000
Salt e/		10,000	10,000	10,000	10,000	10,000
Sodium compounds, n.e.s., soda ash, calcined e/		100	100	--	--	--
Sulfuric acid e/		1,000	500 r/	500 r/	500 r/	500
Mineral fuels and related materials:						
Asphalt and bitumen, natural 4/	thousand tons	19,597	16,900	15,782	16,625	17,000 e/
Coal, lignite	do.	68,936	38,900	33,000	30,000	30,000 e/
Gas, natural, gross production 5/	million cubic meters	22,698	18,271	16,551	14,167	14,000 e/
Petroleum:						
Coke		63,472	33,678	57,842	47,543	50,000 e/
Crude:						
Gross weight	thousand tons	448,214	359,666	364,627	323,009	320,000 e/
Converted e/	thousand 42-gallon barrels	3,300	2,400	2,000	2,400 r/	2,400
Refinery products	do.	503,995	315,072	379,131	328,875	324,000 e/
BOSNIA AND HERZEGOVINA e/ 6/						
Metals:						
Aluminum:						
Bauxite		75,000	75,000	75,000	75,000	75,000
Alumina		50,000	40,000	40,000	40,000	40,000
Metal ingot, primary and secondary		15,000	15,000	15,000	15,000	15,000
Iron and steel:						
Ore and concentrate:						
Ore, gross weight		100,000	100,000	100,000	100,000	100,000
Ore, Fe content		35,000	35,000	35,000	35,000	36,000
Agglomerate		40,000	40,000	40,000	40,000	40,000
Metal:						
Ferroalloys:						
Ferrosilicon		1,000	1,000	1,000	500 r/	500
Silicon		100	100	100	100	100
Pig iron		100,000	100,000	100,000	100,000	100,000
Crude steel		115,000	110,000	110,000	110,000	110,000
Semimanufactures		100,000	100,000	90,000	90,000	95,000

See footnotes at end of table.

TABLE 1--Continued
ADRIATIC BALKANS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
BOSNIA AND HERZEGOVINA--Continued e/ 6/						
Metals--Continued:						
Lead:						
Mineral concentrator output:						
Ore, gross weight (Pb-Zn ore)		10,000	10,000	10,000	10,000	10,000
Pb content of ores		200	200	200	200	200
Pb concentrate		400	400	400	400	400
Metal, smelter, primary and secondary		100	100	100	100	100
Manganese ore:						
Gross weight		2,000	2,000	2,000	2,000	2,000
Mn content		500	500	500	500	500
Zinc:						
Zn content of Pb-Zn ore		300	300	300	300	300
Concentrate output, gross weight		600	600	600	600	600
Industrial minerals:						
Asbestos, all kinds		500	500	500	500	500
Barite concentrate		2,000	2,000	2,000	2,000	2,000
Cement	thousand tons	150	200	300	300	300
Clays:						
Bentonite		800	800	800	800	800
Ceramic clay, crude		20,000	20,000	20,000	20,000	20,000
Kaolin:						
Crude		3,000	3,000	3,000	3,000	3,000
Calcined		1,500	1,500	1,500	1,500	1,500
Gypsum:						
Crude		30,000	30,000	30,000	30,000	30,000
Calcined		3,000	3,000	3,000	3,000	3,000
Lime	thousand tons	50	50	50	50	50
Magnesite, crude		2,000	2,000	2,000	2,000	2,000
Nitrogen, N content of ammonia		500	500	500	500	500
Glass sand		50,000	50,000	50,000	50,000	50,000
Salt, all sources		50,000	50,000	50,000	50,000	50,000
Sand and gravel, excluding glass sand	thousand cubic meters	500	500	500	500	500
Sodium compounds:						
Soda ash		10,000	5,000	5,000	5,000	5,000
Caustic soda		10,000	5,000	5,000	5,000	5,000
Sodium bicarbonate		1,000	500	500	500	500
Stone, excluding quartz and quartzite, dimension, crude:						
Ornamental	square meters	20,000	20,000	20,000	20,000	20,000
Other	cubic meters	2,000	2,000	2,000	2,000	2,000
Crushed and brown, n.e.s.	thousand cubic meters	500	500	500	500	500
Sulfur, byproduct of metallurgy	thousand tons	1	1	1	1	1
Mineral fuels and related materials:						
Brown coal and lignite	do.	1,808 7/	1,810 7/	1,764 7/	1,800	1,800
Petroleum refinery products	thousand 42-gallon barrels	--	500	500	500	500
CROATIA 6/						
Metals:						
Aluminum:						
Metal, ingot, primary and secondary		32,959	17,800	16,112 r/	14,461 r/	14,403
Alloys		5,257	3,354	2,191	843	977
Semimanufactures (rolled)		15,107	21,166	26,148	29,465	30,161
Iron and steel, metal:						
Ferrochromium		10,559 r/	24,231	11,861 r/	--	15,753
Steel, crude, from electric furnaces		45,752	68,733	104,854	74,429 r/	68,360
Industrial minerals:						
Cement	thousand tons	1,842	2,134	2,294	2,712	2,852
Clays:						
Bentonite		9,728	7,331	7,581	8,441	10,013
Ceramic clay		10,000 e/	10,000 e/	5,022	6,000	6,100 e/
Fire clay, crude e/		5,000	5,000	5,000	5,000	5,500
Gypsum:						
Crude		86,060	102,470	107,800 r/	137,991	150,765
Calcined		--	1,260	1,259	1,236	1,176

See footnotes at end of table.

TABLE 1--Continued
ADRIATIC BALKANS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
CROATIA--Continued 6/						
Industrial minerals--Continued:						
Lime	thousand tons	192	208	216	198	220
Nitrogen, N content of ammonia	do.	307	331	248	306 r/	328
Pumice and related materials, volcanic tuff	do.	64	63	38	55	38
Quartz, quartzite, glass sand		43,508	97,563	112,018 r/	99,078 r/	95,636
Salt, all sources		18,820	16,620	24,050 r/	18,373 r/	33,668
Sand and gravel, excluding glass sand	thousand cubic meters	1,401	3,853	4,316	3,644	3,480
Stone, excluding quartz and quartzite, dimension, crude:						
Ornamental	square meters	1,029,437	1,130,728	1,133,405	1,457,334 r/	608,707
Crushed and brown, n.e.s.	thousand cubic meters	9,099	10,520	11,459	11,871	11,000 e/
Other e/	cubic meters	20,000	20,000	20,000	20,000	25,000
Sulfur, byproduct of metallurgy e/		15,000	15,000	15,000	15,000	15,000
Mineral fuels and related materials:						
Carbon, black		26,735	24,124	22,165	17,589	20,029
Coal, bituminous	thousand tons	64	49	51	15 r/	--
Gas, natural, gross production	million cubic meters	1,786	1,717	1,570	1,567	1,768
Petroleum:						
As reported	thousand tons	1,469	1,496	1,535 r/	1,618 r/	1,768
Converted e/	thousand 42-gallon barrels	11,000	11,000	10,400	9,600	10,300
Refinery products		4,731,974	5,056,289	5,053,000	5,438,000	5,700,000
MACEDONIA e/ 6/						
Metals:						
Aluminum, metal, ingot, primary and secondary		4,000	4,000	5,850 7/	5,000	4,500
Cadmium, smelter output	kilograms	85 4/	50 r/	50 r/	50 r/	50
Chromite:						
Ore, gross weight		5,000	5,000	--	--	--
Concentrate (produced largely from imported ores)		3,000	3,000	--	--	--
Copper, mine and concentrate output:						
Ore:						
Gross weight	thousand tons	2,000	2,000	2,000	2,000	2,000
Cu content		8,484 4/	8,000	9,100	10,000 r/	10,000
Concentrate:						
Gross weight		20,000	20,000	20,000	20,000	20,000
Cu content		13,500	13,000	9,100	9,000	9,000
Gold	kilograms	752 4/	650	700	750 r/	750
Iron and steel:						
Iron ore:						
Gross weight		20,000	20,000	20,000	20,000	20,000
Fe content of ore		1,000	1,000	1,000	1,000	1,000
Concentrate		15,000	15,000	15,000	15,000	15,000
Pellets		10,000	10,000	10,000	10,000	10,000
Agglomerate		5,000	5,000	5,000	5,000	5,000
Metal:						
Ferroalloys:						
Ferrochromium, low C		3,780 7/	460 7/	-- 7/	-- 7/	--
Ferronickel (38% Ni), gross weight		7,900	7,900	9,500	5,000	--
Ferrosilicon		57,220	55,000	96,700	63,000	65,000
Silicon		1,000	1,000	1,000 r/	--	--
Total		69,900	64,400	107,200 r/ 7/	68,000 7/	65,000
Steel, crude		27,000	30,000	--	-- 7/	--
Semimanufactures, hot rolled plate		109,000 r/ 7/	183,700 r/ 7/	251,081 r/ 7/	159,643 r/ 7/	244,044 7/
Lead:						
Mine output:						
Ore, gross weight (Pb-Zn ore)		846,244 7/	850,000	867,182 7/	670,000	850,000
Pb content		27,000	28,000	26,000	26,000 7/	25,000
Concentrate, gross weight		16,885 7/	17,000	14,328 7/	12,300 r/ 7/	16,500
Primary and secondary:						
Smelter		23,000 r/	20,000	20,000	20,000	20,000
Refined		23,600 r/	26,046 r/ 7/	28,415 7/	19,738 r/ 7/	22,900
Nickel, metal, Ni content of FeNi		3,000	5,300	5,800	1,900 7/	--
Silver	kilograms	20,025 r/ 7/	18,760 r/ 7/	20,000	22,000 r/	20,000

See footnotes at end of table.

TABLE 1--Continued
ADRIATIC BALKANS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
MACEDONIA--Continued e/ 6/						
Metals--Continued:						
Zinc:						
Concentrate		15,017 7/	15,800 r/	14,328 7/	8,000	12,200
Metal, refined, primary and secondary:						
Smelter		7,000	7,000	7,000	7,000	7,000
Electrolytic		38,000	53,000	57,162 7/	48,000 7/	62,800
Industrial minerals:						
Cement	thousand tons	491 7/	500 7/	461 7/	520 7/	585
Clays, bentonite		30,000	30,000	30,000	30,000	30,000
Diatomite		5,000	5,000	5,000	5,000	5,000
Feldspar		--	--	8,137 7/	11,000	10,000
Gypsum:						
Crude		25,000	25,000	25,000	25,000	25,000
Calcined		5,000	5,000	5,000	5,000	5,000
Lime		20,000	10,000	924	-- 7/	1,000
Pumice and related materials, volcanic tuff		75,000	100,000	100,000	150,000	150,000
Sand and gravel, excluding glass sand	thousand cubic meters	130	130	130	150 r/	150
Stone, excluding quartz and quartzite, dimension, crude:						
Ornamental	square meters	186,783 7/	190,000	190,000	200,000 r/	200,000
Crushed and brown, n.e.s.	thousand cubic meters	400	400	400	400	400
Other	cubic meters	10,000	10,000	10,000	10,000	10,000
Sulfur, byproduct of metallurgy	thousand tons	6	6	6	6	6
Talc:						
Crude		10,000	10,000	10,000	9,000 r/	10,000
Washed		7,000	7,000	7,000	7,000	7,000
Mineral fuels and related materials:						
Coal, lignite	thousand tons	7,887 7/	7,165 7/	7,500	7,500	7,000
Petroleum refinery products	thousand 42-gallon barrels	6,000	6,000	6,000	6,000	6,000
SERBIA AND MONTENEGRO 8/						
Metals:						
Aluminum:						
Gross weight:						
Alumina, calcined		186,354	160,000	152,619	156,012	185,000 e/
Bauxite		323,000	470,000	226,000	500,000	630,000
Metal ingot, primary and secondary		37,346	65,743	60,090	72,505	88,151
Antimony, metal		(9/)	--	--	--	--
Bismuth, metal	kilograms	21	20 e/	430	--	--
Cadmium	do.	79,195	80,000 e/	17,320	--	--
Copper:						
Mine and concentrator output:						
Ore:						
Gross weight	thousand tons	20,026	20,507	19,939	15,975	12,896
Cu content		82,526	82,500	84,627	62,777	52,000 e/
Concentrate:						
Gross weight		337,861	361,000	372,103	272,172	200,000 e/
Cu content		69,500	73,600	70,900 e/	51,700	41,000 e/
Metal, primary:						
Blister and anodes:						
Primary		59,940	59,000 e/	101,000	54,000	45,000 e/
Remelted		65,287	60,000 e/	101,925	49,782	45,000 e/
Total		125,227	119,000 e/	202,925	103,782	90,000
Refined:						
Primary		59,940	70,534	54,000	48,000	45,632
Remelted		44,060	43,000	40,396	1,902	40,000 e/
Total		104,000	113,534	94,396	49,902	85,600 e/
Gold, refined	kilograms	4,000	4,000	2,684	1,260	1,300
Iron and steel:						
Metal:						
Ferroalloys, ferronickel		6,501	6,500 e/	1,215	--	--
Pig iron		535,000	907,000	825,916	134,882	563,000
Crude steel		679,000	979,000	948,314	226,240	682,000
Semimanufactures		860,000	1,460,000	1,740,000	296,300	739,000

See footnotes at end of table.

TABLE 1--Continued
ADRIATIC BALKANS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity	1996	1997	1998	1999	2000
SERBIA AND MONTENEGRO--Continued 8/					
Metals--Continued:					
Iron and steel--Continued:					
Ore and concentrate, agglomerate	50,000 e/	25,000	5,125	2,088	2,000 e/
Lead:					
Mine and concentrator output:					
Ore:					
Gross weight (Pb-Zn ore)	856,468	1,049,000	1,248,852	348,605	602,000
Pb content	22,327	27,000 e/	24,750	4,553	12,000 e/
Concentrate:					
Gross weight	29,009	31,000 e/	32,691	6,536	25,000 e/
Pb content	10,000	11,000	12,000	3,200	9,000
Metal, primary and secondary:					
Smelter	44,600	41,000	35,576	9,000 r/	18,000
Refined	30,317	23,632	23,756	3,690	1,242
Magnesium, metal	2,500 e/	2,500 r/ e/	3,965	1,203	1,200
Nickel, metal, Ni content of FeNi	2,556	2,440	466	--	--
Platinum-group metals:					
Palladium kilograms	56	55 e/	54	21	21 e/
Platinum do.	3	3 e/	3	3	3 e/
Selenium do.	37,840	38,000 e/	40,866	20,080	20,000 e/
Silver do.	68,805	42,640	34,474	7,643 r/	7,645
Zinc:					
Zn content:					
Pb-Zn ore	21,765	25,000 e/	20,285	4,329	12,000 e/
Concentrate	12,000	13,000	14,000	5,000 e/	11,000 e/
Concentrator output, gross weight	37,012	35,000 e/	40,530	10,286	23,000 e/
Refined	29,954	29,454	14,415	683 r/	8,291
Industrial minerals:					
Asbestos, all kinds	509	765	1,452	361	563
Cement thousand tons	2,205	2,011	2,253	1,575	2,117
Clays:					
Bentonite	95	100 e/	68	77	75 e/
Ceramic clay	36,021	35,000 e/	40,033	29,420	30,000 e/
Fire clay:					
Crude	43,053	51,000	45,319	25,766	30,000 e/
Calcined e/	8,000	10,000	10,000	4,000	10,000
Kaolin:					
Crude	60,000 e/	60,000 e/	75,092	40,321	40,000 e/
Washed e/	6,000	6,000	6,000	4,000	4,000
Feldspar, crude	4,801	4,880	4,280	3,453	3,000 e/
Gypsum, crude	44,257	32,124	27,778	33,962	30,000 e/
Lime thousand tons	456	460	480	381	497
Magnesite:					
Crude do.	89	98	949	31	40
Caustic calcined	10,601	6,327	7,044	2,000	3,000 e/
Mica, all grades	200 e/	200 e/	247	229	230
Nitrogen, N content of ammonia	235,070	235,000	166,152	75,788	150,000 e/
Pumice and related materials, volcanic tuff	120,135	120,000 e/	120,000	50,000	120,000 e/
Quartz sand thousand tons	361	366	353	253	418
Salt, all sources	21,646	28,000	78,148	63,834	78,277
Sand and gravel, excluding glass sand thousand cubic meters	3,291	2,351	3,060	2,006	2,000
Sodium compounds:					
Caustic soda	20,214	64,713	63,344	13,720	7,415
Sodium sulfate	7,000 e/	5,000	1,896	1,321	800 e/
Stone, excluding quartz and quartzite, dimension, crude:					
Ornamental square meters	219,000	206,000	258,000	182,000	20,000 e/
Crushed and brown, n.e.s. thousand cubic meters	2,263	2,665	3,085	1,937	3,000 e/
Other, stone blocks cubic meters	12,196	9,817	1,630	786	1,000 e/
Sulfur, byproduct: e/					
Metallurgy thousand tons	110	100	100	100	100
Petroleum do.	1	1	1	1	1
Total do.	111	101	101	101	101

See footnotes at end of table.

TABLE 1--Continued
ADRIATIC BALKANS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
SERBIA AND MONTENEGRO--Continued 8/						
Mineral fuels and related materials:						
Coal:						
Bituminous	thousand tons	63	92	105	49	88
Brown	do.	539	512	390	413	398
Lignite	do.	37,828	42,313	43,577	30,967	33,638
Total	do.	38,430	42,917	44,072	31,429	34,124
Gas, natural, gross production	million cubic meters	671	688	731 r/	679 r/	729
Petroleum:						
Crude:						
Gross weight	thousand tons	1,030	979	913	705	805
Converted e/	thousand 42-gallon barrels	7,600	7,500	6,800	5,200	6,000 4/
Refinery products	thousand tons	1,800 r/	3,167 r/	2,549 r/	1,047 r/	1,100 e/
SLOVENIA 6/						
Metals:						
Aluminum, metal, ingot, primary and secondary		59,486	74,400	73,803 r/	77,200 r/ e/	100,000
Iron and steel, metal:						
Ferroalloys:						
Ferrochromium		23,142	9,232	10,621	560	600
Ferrosilicocalcium e/		200	200	200	200	200
Ferrosilicon e/		10,000	10,000	10,000	8,000	9,000
Steel, crude, from electric furnaces		328,000	372,700	405,210	405,000	450,000
Semimanufactures		175,000	150,000	150,000	100,000 e/	100,000
Lead, metal:						
Primary and secondary:						
Smelter e/		6,000	7,000	7,000	5,800 r/	6,000
Refined		5,601	15,000	14,000	15,000	15,000 e/
Semimanufactures, rolled		241	300	300	300 e/	300 e/
Industrial minerals:						
Cement	thousand tons	1,026	1,113	1,149	1,224 r/	1,300
Clays:						
Ceramic clay, crude e/		2,500	2,500	2,500	2,500	2,500
Fire clay		600	--	--	-- e/	-- e/
Kaolin: e/						
Crude		10,000	10,000	10,000	10,000	10,000
Washed		4,000	4,000	4,000	4,000	4,000
Lime	thousand tons	136	140	150	150 e/	150 e/
Pumice and related materials, volcanic tuff e/		40,000	40,000	40,000	40,000	40,000
Quartz, quartzite, glass sand: e/						
Quartz and quartzite		10,000	10,000	10,000	10,000	10,000
Glass sand		200,000	200,000	200,000	200,000	200,000
Total		210,000	210,000	210,000	210,000	210,000
Salt, all sources		4,033	5,000	5,000	5,000	5,000
Sand and gravel, excluding glass sand	thousand tons	10,498	10,298	10,076	12,637 r/	14,000
Stone, excluding quartz and quartzite, crude: e/						
Dimension		93,000	82,000	91,000	104,000	105,000
Other	cubic meters	3,000	3,000	3,000	3,000	3,000
Mineral fuels and related materials:						
Coal:						
Brown	thousand tons	841	812	827	758 r/	800
Lignite	do.	3,937	4,163	4,100 r/	3,804 r/	3,900
Gas, natural, gross production	thousand cubic meters	12,840	12,100	12,500	12,500 e/	12,500 e/
Petroleum, crude	thousand tons	1,400	1,100	900	100	100 e/

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add totals shown.

2/ Table includes data available through May 18, 2001.

3/ In addition to commodities listed, a variety of industrial minerals and construction materials (common clay, quartz, sand and gravel, stone, and titanomagnesite) are produced; output is not reported quantitatively, and available information is inadequate to make reliable estimates of output levels.

4/ Includes asphalt and bitumen produced at petroleum refineries.

5/ Separate data on marketable production are not available, but gross and marketed output are regarded as being nearly equal.

6/ In addition to the commodities listed, common clay was also produced, but available information was inadequate to make reliable estimates of output.

7/ Reported figure.

8/ In addition to the commodities listed, common clay and diatomite are also produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
ALBANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Commodity	Location of main facilities (all state-owned)	Annual capacity
Cement	Elbasan, 32 kilometers southeast of Tirana; Kruje, 20 kilometers northwest of Tirana; Shkoder, 85 kilometers of Tirana; and Vlore, southwest of Tirana	1,200
Chromite	Bater (including Bater I and II and Martanesh), 40 kilometers northwest of Tirana	450
Do.	Bulquize (including Bulquize south, Fush, Ternove, and Todo Maco), 35 kilometers nortwest of Tirana	450
Do.	Kalimash, 60 kilometers north of Tirana	250
Do.	Kam, 70 kilometers north of Tirana	100
Do.	Klos, 20 kilometers northeast of Tirana	50
Do.	Pogradec (including Katjiel, Memelisht, Pojske, Pishkash, and Prrenjas), 50 kilometers east of Tirana	100
Ferrochromium	Burrel, 35 kilometers northeast of Tirana	40
Do.	Elbasan, 32 kilometers southeast of Tirana	36
Copper:		
Ore	Fushe-Arrez, 80 kilometers north of Tirana	350
Do.	Gjejan, 100 kilometers northeast of Tirana	150
Do.	Golaj (including Nikoliq and Pus), 120 kilometers northeast of Tirana	150
Do.	Kurbnesh-Perlat, 55 kilometers northeast of Tirana	100
Do.	Rehove, 110 kilometers southeast of Tirana	100
Do.	Reps (including Gurch, Lajo, Spac, and Thurr), 55 kilometers north of Tirana	350
Do.	Rreshen, 50 kilometers north of Tirana	50
Do.	Shkoder (including Palaj, Karma I and II), 85 kilometers northwest of Tirana	100
Smelter	Kukes, 110 kilometers northeast of Tirana	6
Do.	Lac, 35 kilometers northwest of Tirana	7
Do.	Rubik, 50 kilometers north of Tirana	4
Iron ore	Prrenjas (Bushtrica, Prrenjas, Skorska I and II), 70 kilometers southeast of Tirana	650
Do.	Guri i Kuq (including Cervenake, Grasishta, Guri i Kuq, Hudenisht and Gun Perfjrgjur), 25 kilometers east of Tirana	500
Steel	"Steel of the Party" Metallurgical Combine at Elbasan	150
Nickel, smelter	Elbasan	6
Coal, lignite	Maneze, Mezes, and Valias Mines in Tirana Durres area; Krabe Mine, 20 kilometers southeast of Tirana; Alarup and Cervnake Mines, in Pogradec area, 80 kilometers southeast of Tirana; Mborje-Drenove Mine in Korce area, 85 kilometers southwest of Tirana; and Memaliaj Mine in Tepelene area, 110 kilometers south of Tirana	2,500
Natural gas million cubic feet	Gasfields on southwest Albania between Ballsh and Fier	16,000
Petroleum:		
Crude 42-gallon barrels per day	Oilfields at Marineze, Ballsh, Shqisht, Patos, Kucova, Gorrisht, and others	35,000
Refined do.	Refineries: Ballsh, Cerrik, Fier, and Stalin	33,000

1/ A substantial portion of these enterprises have been operating significantly below capacity during the transition to a market economy; the capacities provided in this table only represent the latest available information and may not show the true status of these enterprises.

TABLE 3
BOSNIA AND HERZEGOVINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Energoinvest	Plants at Birac-Zvornik	600
Do.	do.	Plant at Mostar	280
Aluminum	do.	Smelter at Mostar	92
Bauxite	do.	Mines at Vlasenica, Jajce, Bosanska Krupa, Posusje, Listica, Citluk, and others	2,000
Coal:			
Brown	SOUR Titovi Rudnici Uglja, Tuzla	Mines in BiH	12,000
Lignite	do.	do.	7,000
Cement	Gik Hidrogradnja, Tvornica Cementa BiH	Plant at Kakanj	650
Ferroalloys	Elktrobosna, Elektrohemijska i Electrotermijska Industrija	Plant at Jajce	80
Iron ore	Rudarsko Metalurski Kombinat Zenica	Mines at Vares, Ljubija, and Radovan	5,000
Lead-zinc ore	Energoinvest	Mine and mill at Srebrenica	300
Manganese ore	Mangan-Energoinvest	Mine and concentrator at Buzim	100
Petroleum, refined thousand barrels per day	Energoinvest: Rafinerija Nafte Bosanski Brod	Refinery at Bosanski Brod	100
Pig iron	Rudarsko metalurski Kombinat Zenica	4 blast furnaces at Zenica	2,250
Do.	do.	2 blast furnaces at Vares	100
Do.	do.	Electric reduction furnaces at Iljas	100

TABLE 3--Continued
BOSNIA AND HERZEGOVINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Salt	cubic meters per year	Hemijski Kombinat "Sodaso," Rudnik Soli i Solni	Rock salt mines at Tusanj	120,000
Do.	do.	do.	Production from brine at Tuzla	2,000,000
Steel, crude		Rudarsko Metalurski Kombinat Zenica	Plant at Zenica	2,060

TABLE 4
CROATIA: STRUCTURE OF THE MINERALS INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Alumina		Jadral, Jadranski Aluminijum	Jadral Alumina Plant	150
Aluminum		Boris Kidric Tvornica Lakih Metala	Smelter at Sibenik	75
Do.		Top-Tvornica Olovni i Aluminjskikh	Semimanufactures producer at Savska	NA
Bauxite		Jadral, Jadranski Aluminijum	Mines in at Obrovac, Drnis, and other locations	450
Coal, bituminous		Istarski Ugljenokopi Rasa	Mines at Labin and Potpican	500
Cement		Dalmacija Cement	Sv. Jurai plant at Kastel Sucurac	1,300
Do.		do.	Sv. Kajo plant at Solin	750
Do.		do.	Majdan plant at Solin Majdan	780
Do.		Istra Cement International D.D.	Plant at Pula	70
Do.		Tvornica Cementa Koromacno	Plant at Koromacno	420
Do.		Tvornica Cementa Umag D.D.	Cement plant at Umag	480
Do.		Nasicecement D.D.	Nacise plant at Tajnovac	840
Natural gas	million cubic feet	do.	Main natural gasfields at Bogsic Lug, and Molve	70,000
Petroleum:				
Crude	thousand barrels per day	Industrija Nafted.d. Zagreb (INA)	Oilfields in Croatia and Slovenia include Benicanci, Zutica, Strużec, Ivanic Grad, and Lendava	70
Do.	do.	do.	Refineries at Urinj and Rijeka	160
Do.	do.	do.	Refinery at Sisak	150
Pig iron		Metalurski Kombinat Zeljezara Sisak	Two blast furnaces at Sisak	235
Salt	cubic meters	Solana Pag, Solana Ante Festin	Marine salt: Pag Island	13
Steel, crude		SP MK Zeljezare Sisak d.d.	Plant at Sisak	401
Do.		Jadranska Zelejzara Split	Plant at Split	120

NA Not available.

TABLE 5
MACEDONIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity e/
Cement	Azbestcementa "Usje" Preduzece za Proizvodnju Cementa	Plant at Skopje	2,190
Chromite, concentrate	Jugohrom, Hemijsko-Elektrometakurski Kombinat (HEK)	Concentrator at Radusa	150
Copper ore	Bucim, Rabotna Organizacija za Rudarstvo i Metalirgija za Baker	Mine and mill at Bucim, near Radovis	7,000
Ferroalloys	Jugohrom, Hemijsko-Elektrometalurski Kombinat (HEK)-Jegunovce	Plant at Jegunovce	80
Iron ore	Skopje, Rudnici i Zeljezarnica Skopje	Mines at Tajmiste, Demir Hisar, and Damjan	1,000
Lead-zinc ore	Prepobotuvacki, Kombinat Zletovo-Sasa: Sase, Rudnici za Olovo i Cink	Mine and mill near Kamenica	300
Do.	Zletovo, Rudnici za Olovo i Cink	Mine and mill near Probistip	700
Lead metal	Zletovo, Topilnica za Cink i Olovo	Imperial smelter at Titov Veles	40
Do.	do.	Refinery at Titov Veles	40
Nickel: 1/			
Ore	Feni-Rudnici i Industrija za Nikel, Celik i Anrimon	Mine and opencast mine near Kavadarci	2,300
Metal	do.	Ferronickel plant at Kavadarci	161
Pig iron	Skopje, Rudnici i Zeljezarnica Skopje	Five Elkem electric furances at Skopje	430
Steel, crude	do.	Plant at Skopje	980
Zinc metal	Zletovo, Topilnica za Cink i Olovo	Imperial Smelter plant and refinery at Titov Veles	65

e/ Estimated.

1/ Nickel in ferronickel.

TABLE 6
SERBIA AND MONTENEGRO: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand of metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Kombinat Aluminijuma Titograd	Plant at Titograd, Montenegro	200.
Aluminum	do.	Smelter at Titograd, Montenegro	100.
Antimony, ores and concentrates	Zajaca, Rudarsko Tapionicarski Bazen	Mines and mills near Zajaca, Serbia	80.
Do.	do.	Mines and mill at Rajiceva Gora, Serbia	300.
Antimony, metal	do	Smelter at Zajaca, Serbia	4.
Bauxite	Rudnici Boksita, Niksic	Mines in Montenegro at Kutsko Brdo, Zagrad, Biocki Stan, Durakov Dol, and others	650.
Coal:			
Bituminous	Ibarski Rudnici Kamenog Uglja	Mines at Jarando and Usce, near Baljevac na Ibru, Serbia	250.
Lignite	SOUR Kolubara, Rudarsko Energetsko Industrijski Kombinat, RO	Opencast mines: Polje B and Polje D	10,000.
Do.	Kolubara Povrsinski Kopovi	Tamnavski Kopovi (also known as Kolubarski Rudnici Lignita), near Vreoci, Serbia	14,000.
Do.	SOUR Elektroprivreda Kosova, RO Kosovo, Proisvodnja Separacija i Transport Uglja	Opencast mines at Dobro Selo and Belacevac, near Obilic, Serbia	2,000.
Cement	Becinska Fabrika Cementa	Plant at Beocin, Serbia	2,031.
Do.	Fabrika Cementa Novi Popovac	Plant at Popovac, Serbia	1,613.
Copper	Rudarsko Topionicki Bazen Bor	Smelter at Bor, Serbia	180.
Do.	do.	Electrolytic refinery at Bor, Serbia	180.
Do.	do.	Mine and mill at Bor, Serbia	5,000 ore.
Do.	do.	Mine and mill at Majdanpek, Serbia	15,000 ore
Do.	do.	Mine and mill at Veliki Krivelj, Serbia	8,000 ore.
Lead-zinc ore	Rudarsko-Metalursko-Hemijski Kombinat za Olovo i Cink Trepca	Mines at Ajvalija, Kopanaonik, Badovac; Trepca, Blagodat, Lece; Veliki Majdan, Tisovak; and Kisnica, Rudnik, Suplja Stijena	5,000.
Do.	do.	Mills at Kriva Feja, Lece, Rudnik, Badovac, Leposavic, Zvecan, and Maravce, Suplja Srijena	3,160.
Do.	Hemijska Industrija Zorka: Brskovo, Rudnici Olova i Cinka	Mine at Brskovo, Montenegro	500.
Do.	Veliki Majdan Rudnik Olova i Cinka	Mine at mill near Krupanj, Serbia	250.
Lead, metal	Rudarsko Metalursko Hemijski Kombinat za Olovo i Cink Trepca	Smelter at Zvecan, Serbia	180.
Do.	do.	Refinery at Zvecan, Serbia	90.
Magnesite, concentrate	Rudnici Magnezita "Sumadija"	Mine and plant at Sumadija, 20 kilometers northwest of Cacak, Serbia	120.
Do.	Rudnik i Industrija Magnezita "Strezovce"	Opencast mine at Beli Kamen, Strezovce, near Itiova Metrovica, Serbia	300.
Do.	do.	Sinter plant at Strezovce	40.
Do.	Magnohrom, Rudnik Magnezita "Magnezit"	Mine at Bela Stena, Baljevac na Ibru, Serbia	30.
Natural gas million cubic feet	Naftaplin (Naftagas), RO za Istazivanje, i Prozvodnju Nafte i Gasa	Natural gasfields in Serbia include Kinkinda	30,000.
Petroleum:			
Crude thousand barrels per day	Naftagas, Naftna Industrija	Oilfields in Serbia include Kikinda	30.
Refined do.	Naftagas, Naftna Industrija, Rafinerija Nafte Pancevo	Refinery at Pancevo, Serbia	110.
Do. do.	Naftagas, Naftna Industrija, Rafinerija Nafte Novi Sad	Refinery at Novi Sad, Serbia	28.
Pig iron	Metalurski Kombinat, Smederevo	Blast furance at Smederevo, Serbia	720.
Steel, crude	do.	Plant at Smederevo, Serbia	600.
Zinc metal	Rudarsko Metalursko Hemijski Kombinat Oloca i Cinka Trepca, Metalurgija Cinka	Electrolytic plant at Titova Metrovica, Serbia	40.
Do.	Hemijska Industrija Zorka	Electrolytic plant at Sabac, Serbia	40.

TABLE 7
SLOVENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Talum d.o.o.	Plant at Kidricevo	120
Aluminum	do.	Smelter at Kidricevo	72
Coal:			
Brown	SOZC, Rudarsko Energetski Kombinat E. Kardelj, Trobovlje, Slovenia	Mines: Sasavski Rudnici at Trbovlje, Hrastnik, Ojstro, Senovo, and Kanizarnica	1,300
Lignite	Rudarsko Energetski Kombinat Velenje, RO Rudnik Lignita-Velenje	Mine at Velenje	5,000
Cement	Salonit Anhovo	Plant at Anhovo	1,120
Lead metal	Rudnik Svinca in Topilnica, Mezica	Smelter at Mezica	35
Do.	do.	Refinery at Mezica	30
Petroleum, refined thousand barrels per day	Industrija Nafte (INA) Rafinerija Nafte Lendava	Refinery at Lendava	16
Pig iron	Zdruzeno Podjetje Slovenske Zelezarne	Two blast furnaces at Zelazara Jesenice	300
Do.	Zelezara Store	Electric reduction furnaces at Store pri Celju	290
Steel, crude	Zdruzeno Podjetje Slovenske Zelezarne	Plant at Jesenica	500
Do.	do.	Plant at Ravne	162
Do.	do.	Plant at Store	140

THE MINERAL INDUSTRY OF

AUSTRIA

By Harold R. Newman

Although the mining industry has maintained a long tradition n Austria, the metal mining sector was declining, principally owing to high operating costs, low ore grades, environmental problems, and increased foreign competition. This was not the case with the industrial minerals sector, which had been producing a number of important minerals. Austria was considered to be a significant producer of graphite (10th in the world) and talc (9th in the world) with about 2.5% of the total world output of graphite and about 1.6% of the total world output of talc. Recycling activities also increased (table 1).

Because of Austria's dependence on foreign trade, its economy was closely linked to the economies of other European Union (EU) member states, particularly Germany. Foreign trade and investment ties with Central and Eastern European countries played an increasingly important role. From 2000 to 2004, the Austrian economy was expected to grow at an average real rate of about 2.4% per year, slightly lower that the EU-wide average of 2.5% (U.S. Embassy, Vienna, Austria, 2000, p. 6). Table 2 lists selected indices of industrial production.

The Government was removing many of Austria's restrictions on business and was intent on privatizing state-owned companies. It was estimated that until 1997 about 40% of Austria's gross national product was controlled by the state, tying Russia for the highest percentage in Europe. After completing a 10-year privatization program in 1997, the Government introduced another privatization plan in early 2000 that included state-owned industries' groups of aluminum, petroleum, and steel. The Government will review full privatization of its shareholdings in the partly privatized companies Österreichische Mineralolverwaltung AG (OMV) in petroleum, Voest-Alpine Stahl GmbH in steel, and Voest-Alpine AG in technology (U.S. Embassy, Vienna, Austria, 2000, p. 8, 46).

During the last several years, the Austrian mineral industry had turned away from coal and base metal mining. Except for the iron ore operation at Erzberg and the tungsten operation at Mittersill, all the metal mines were closed. Most of the growth in the mineral resources area was in the production of industrial minerals for which operations were developed by the private sector. Although partial privatization of state-owned industries was underway, a portion of the mineral industry was still under government control (table 3).

The Erzberg Mine of Voest-Alpine Erzberg GmbH produced a beneficiated iron ore that was shipped by rail to the nearby steel mills of Voest-Alpine Stahl AG for further beneficiation and production of self-fluxing sinter that averaged 50% iron and 3% manganese.

Wolfram Bergbau und Hütten GmbH operated the Western World's largest underground tungsten mine at Mittersill and a tungsten conversion plant at Bergla.

Ample supplies of calcite, dolomite, and limestone were available to support a viable cement industry in Austria. The market was relatively fragmented; only two of the five major producing companies had more than one plant.

Austria was one of the world's largest sources of high-grade graphite. Grafitbergbau Kaiserberg AG operated open pit mines at Kaisersberg and at Trieben. Grafitbergbau's 30,000-t/yr capacity processing plant at Kaisersberg consisted of drying, classification, milling, flotation, and fine-grinding sections.

Austrian salt mines were owned by the Government and regulated by the Ministry of Finance. All salt output was from three underground mines and one brine well in central Austria. The Government was proceeding with plans to privatize the operations. Luzenac Naintsch AG, which was the only producer of talc in Austria, operated three mines in the Styria region and produced a range of talc, chloritic talc, dolomite talc, and chlorite-mica-quartz ores.

In the coal mining sector, the open pit Oberdorf Mine of Graz-Koflacher Eisenbahn und Bergbau Gesellschaft mbH was the only lignite mine with any significant production.

OMV bought a 15% stake in exploration acreage west of the Shetland Islands north of Scotland from Shell UK. OMV said the acquisition was part of its strategy to develop oil and gas production in the North Sea, which was one of its core areas. The company was aiming to increase group output to 100,000 barrels per day by 2002 (Alexandria's Gas & Oil Connections, July 7, 2000, Austria's OMV buys stake in west of Shetland Islands, accessed July 13, 2000, at URL http://gasandoil.com/goc/company/cne02782.htm).

Because of Austria's long history of minerals exploration and a strong mining tradition, geologic conditions are fairly well known. Future mining activities will most likely be concentrated in industrial minerals, mainly for domestic consumption. The chances of finding new and workable base metal deposits are probably remote.

Reference Cited

U.S. Embassy, Vienna, Austria, 2000, FY 2001 country commercial guide—Austria: U.S. Department of State, July, 76 p.

Major Source of Information

Bundesministerium für Wirtschaft und Arbeit
Denisgasse 31
1200 Vienna, Austria

TABLE 1
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Aluminum metal, secondary		97,500	118,800	116,500	143,000 r/	140,000
Copper, refined:						
Primary		1,000 e/	2,000 e/	1,000	5,000 r/	2,000
Secondary		57,000 e/	74,000 e/	71,000	77,573 r/	77,000
Total		58,000 e/	76,000 e/	72,000	82,573 r/	79,000 3/
Gold, metal e/	kilograms	100	100	100	100	100
Iron and steel:						
Iron ore and concentrate: e/						
Gross weight	thousand tons	1,853 3/	1,800	1,797	1,752	1,800
Fe content	do.	504 3/	500	500	553 3/	500
Metal:						
Pig iron	do.	3,416	3,965	4,022	3,913	4,318 3/
Ferroalloys, electric-furnace e/	do.	11	11	12	12	12
Crude steel	do.	4,442	5,196	5,298	5,213	5,725 3/
Semimanufactures	do.	3,837	4,516	4,640	4,657 r/	5,035 3/
Lead, refined, secondary		22,900	22,700	23,100	24,500 e/	24,000
Manganese, Mn content of domestic iron ore e/		26,000	25,000	24,000	20,000	20,000
Tungsten, mine output, W content of concentrate		1,413	1,400	1,423	1,610	1,600
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	3,873	3,852	3,850	3,800 e/	3,800
Clays:						
Ilite	do.	151	150 e/	186	190 e/	305 3/
Kaolin:						
Crude	do.	180	180 e/	298	152	119 3/
Marketable	do.	60	60 e/	100	50 e/	50
Other e/	do.	3,000 3/	2,800	2,800	2,600	2,600
Graphite, crude		12,000	12,000 e/	10,738	12,635	12,000
Gypsum and anhydrite, crude	thousand tons	996	1,000 e/	961	999	946 3/
Lime e/	do.	1,990 3/	2,000	2,000	2,000	2,000
Magnesite:						
Crude	do.	624	650 e/	723	749 3/	726 3/
Sintered or dead-burned	do.	289	300 e/	325	325	325
Caustic calcined e/	do.	52 3/	60	60	60	60
Nitrogen, N content of ammonia e/		400	400	400	450	450
Pigments, mineral, micaceous iron oxide e/		7,500	7,500	7,000	6,000	6,000
Pumice (trass)		6,000 e/	6,000 e/	6,137	4,272	3,961 3/
Salt: e/						
Rock	thousand tons	1	1	1	1	1
In brine	do.	367 3/	400	400	400	400
Sand and gravel:						
Quartz sand	do.	6,012	6,000 e/	6,329	6,857	6,985 3/
Other sand and gravel e/	do.	16,000	18,000	18,000	18,000	18,000
Total	do.	22,012	24,000 e/	24,329	24,900 e/	24,985
Sodium compounds, n.e.s.: e/						
Soda ash, manufactured	do.	200	200	150	150	150
Sulfate, manufactured	do.	100	100	100	100	100
Stone: 4/						
Dolomite	thousand tons	9,155	9,000 e/	8,978	7,968	7,152 3/
Quartz and quartzite	do.	317	282	398	409	372 3/
Other:						
Limestone and marble e/	do.	20,000	20,000	20,000	26,409	23,824 3/
Basalt	do.	698	647	5,075	5,201	4,933 3/
Marl	do.	2,000	2,000	1,364	1,423	1,559 3/
Crushed stone e/	do.	12,000	12,000	12,000	12,000	12,000
Total	do.	34,698	34,647	38,429	38,624	38,500
Sulfur, byproduct of petroleum and natural gas e/		10,000	9,000	9,000	9,468	9,646 3/
Talc and soapstone, crude		130,000	155,730	137,114	129,516	133,060 3/

See footnotes at end of table

TABLE 1--Continued
AUSTRIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
MINERAL FUELS AND RELATED MATERIALS						
Coal, brown and lignite	thousand tons	1,110	1,122	1,191	1,137	1,255
Coke	do.	1,559	1,567	1,500	1,400 e/	1,400
Gas, natural:						
Gross	million cubic meters	1,400 e/	1,400 e/	1,568	1,791	1,805 3/
Marketed e/	do.	1,000	1,000	1,000	1,000	1,200
Oil shale		498	500 e/	500	496 3/	440 3/
Petroleum:						
Crude	thousand 42-gallon barrels	7,121	7,200 e/	7,624	6,879	7,024 3/
Refinery products:						
Liquefied petroleum gas	do.	7,416	7,000 e/	325	241	186 3/
Gasoline	do.	19,541	20,120	19,540	18,196	15,413 3/
Kerosene and jet fuel	do.	3,823	3,832	3,960	4,256	4,360 3/
Distillate fuel oil	do.	9,000	9,000 e/	29,019	27,387	25,897 3/
Residual fuel oil	do.	9,510	9,623	9,710	8,521	6,325 3/
Unspecified	do.	8,000	8,000	8,393	8,673	14,748 3/
Refinery fuel and losses	do.	2,200	2,000 e/	4,781	5,497	5,149 3/
Total	do.	59,490	59,600 e/	75,728	72,771	72,078 3/

e/ Estimated. r/ Revised.

1/ Table includes data available throughJune 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reported figure.

4/ Excludes stone used by the cement and iron and steel industries.

TABLE 2
AUSTRIA: SELECTED INDICES OF PRODUCTION

(1990 = 100)

Sector	1997	1998	1999	2000 e/
General	121	131	138	145
Mining	87	93	96	95
Manufacturing	122	133	141	150
Electricity and gas	120	122	129	130
Construction	92	105	107	100

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no. 12, December, p. 24.

TABLE 3
AUSTRIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Aluminum Lend GmbH (Salzburger Aluminium AG, 100%)	Secondary ingot plant at Lend	25
Do.	Austria Sekundär Aluminium GmbH (Amag Austria Metall, 100%)	Secondary ingot plant at Ranshofen	50
Cement	Lafarge Perlmooser AG (Lafarge France, 100%)	Plants at Mannesdorf and Retsnei	2,200
Do.	Wietersdorfer Zemenwerke	Plants at Peggau and Wietersdorf	1,000
Do.	Zementwerk Leube	Plant at Gartenau	700
Do.	SPZ Zemenwerke Eiberg	Plant at Eiberg	600
Do.	Gmundner Zement	Plant at Gmundner	580
Coal	Graz-Koflacher Eisenbahn und Bergbau Gesellschaft mbH (Government, 100%)	Oberdorf Mine	1,200
Copper	Austria Metall AG (Metal Mining Corp. of Canada, 41%; Mount Isa Mines of Australia, 41%; and Government, 18%)	Plant at Brixlegg	75
Graphite	Industrie und Bergbaugesellschaft Pryssok & Co. KG	Trandorf Mine at Mühldorf	15
Do.	Grafitbergbau Kaiserberg AG	Kaisersberg Mine	3
Do.	do.	Trieben Mine	3
Gypsum	Erste Salzburger Gipswerk-Gesellschaft Christian Moldan KG	Abtenau and Moosegg Mines	300
Do.	Rigips Austria GmbH	Grundlsee, Puchberg, Unterkainisch, and Weisenbach Mines	250
Do.	Knauf Gesellschaft GmbH	Hinterstein Mine	160
Iron ore	Voest-Alpine Erzberg GmbH (Government, 100%)	Erzberg Mine at Eisenerz	1,000
Lead	Bleiberg Bergwerks-Union AG (Metall Gesellschaft, 74%)	Smelter at Brixlegg	55
Magnesite	Veitsch Radex AG	Mines at Breitenau, Hochfilzen and Radenthein	600
Do.	Radex Austria AG (Osterreichische Magnesit AG, 100%)	Millstatteralpe Mine	250
Natural gas million cubic meters	Oesterreichische Mineralolverwaltung AG (Government, 100%)	Fields in Vienna Basin	1,500
Steel	Voest-Alpine Stahl GmbH (Government, 100%)	Plants at Donawitz and Linz	4,500
Talc	Luzenac Naintsch AG	Mines at Lassing, Rabenwald, and Weisskirchen; plants at Oberfeistitz and Weisskirchen	160
Tungsten	Wolfram Bergbau und Hütten GmbH (Inmet Mining Corp., 100%)	Mittersill Mine, Salzburg; conversion plant, Bergla	350

THE MINERAL INDUSTRIES OF

BELGIUM AND LUXEMBOURG

By Harold R. Newman

BELGIUM

The mineral-processing industry was a significant contributor to the Belgian economy in 2000. The refining of copper, zinc, and minor metals and the production of steel, all from imported materials, were the largest mineral industries in Belgium. The extraction and recovery of nonferrous metals were carried out in large-scale, high-technology plants. Europe's largest electrolytic copper and zinc refineries were in Belgium, as was one of the continent's largest lead refineries. The country was also a significant producer of cadmium, germanium, selenium, and tellurium as byproducts from smelting and refining operations.

Although the country is small, Belgium has a significant industrial minerals sector. The country was an important producer of four groups of industrial materials: carbonates, which included limestone, dolomite, and whiting; synthetic materials in the form of soda ash and sodium sulfate; silica sand; and construction materials, which included a wide range of different types of marble.

Environmental policy in Belgium was the responsibility of the Federal Ministry of the Environment, as well as its comparable ministries in Flanders and Wallonia, which are two separate regions of the country. Individual companies were responsible for environmental protection in their own areas of concern and contributed to environmental investment programs. These environmental programs ranged from treating oil effluent to reducing air pollution emissions.

Belgium was a major exporting country with a highly developed market economy and, in 1999 (the year for which the latest data are available), was ranked as the 11th largest trading nation in the world, with exports and imports each equivalent to about 70% of the gross national product, thus making it one of the highest per capita exporters in the world. It has a long history of reliance on international trade. Three-quarters of Belgium's trade were with other member states of the European Union (EU) (U.S. Department of State, July 2001, FY 2001 country commercial guide, accessed March 13, 2001, at URL http://www.state.gov/www/about_state/business/com_guides2001.pdf).

On May 1, 1998, Belgium became a member of the European Monetary Union. Belgium will gradually shift from the use of the Belgian franc (BF) to the use of the euro (€) as its currency by January 1, 2002. On January 1, 1999, the exchange rate between the Belgian franc and the euro was established at BF40.3399 to €1.0000 (U.S. Department of State, July 1999, FY2000 country commercial guide—Belgium, accessed July 19, 2000, at URL http://www.state.gov/www/about_state/business/com_guides/2000/europe/belgium00_02.html).

Belgium, the Netherlands, and Luxembourg (BENELUX) form the BENELUX customs unit. Since 1921, the economic union between Belgium and Luxembourg, which is known as the Belgium-Luxembourg Economic Union (BLEU), has involved the parity of currency, integrated foreign trade (including statistics), a balance-of-payments account, and a joint central bank. International trade data for Belgium are covered in the context of the BLEU and, as such, also cover the exports, reexports, and imports of Luxembourg. Other members of the EU were the BLEU's most important trading partners.

Production of mineral commodities generally remained stable during 2000. As in the past, any increases in production generally followed the lines of exported goods, such as value-added nonferrous metals (table 1).

Table 2 lists the principal mining and mineral-processing facilities in Belgium with their location and capacity. The only mining operations left in Belgium in 2000 were for the production of sand and gravel and the quarrying of stone. Marble was an important export commodity. The metal-processing sector of the industry almost exclusively used imported raw materials, whether metal concentrates, scrap, or other materials, for smelting and refining or metal for forming and casting.

Union Minière (UM) was one of the world leaders in the nonferrous metals sector. UM produced and marketed more than 20 nonferrous, precious, and speciality metals through its four business units: the copper and precious metals unit, the zinc unit, the advanced materials unit, and the diamond and synthetic abrasives unit. UM's industrial activities covered smelting and refining, transformation, and recycling and provided base metals and semifinished products for other industries. UM's precious metals facility recycled complex industrial intermediate materials and specific precious-metal-bearing scrap from electronic, photography, and catalyst applications (Mining Magazine, 1999).

Sté. Générale de Belgique (SGB) disposed of its 25.2% stake in UM via a convertible bond issue. The bond issue was exchangeable for shares totaling 22.2% of UM's share capital. The rest of SGB's interest was sold to UM management in the form of options (Metal Bulletin, 2000d).

UM delayed making a decision on whether to upgrade its zinc smelters partly due to a labor strike in 2000. The plan included expanding smelter capacity at the Balen and Auby plants by about 60,000 metric tons per year (t/yr)—Auby by 40,000 t/yr and Balen by 20,000 t/yr. On completion of the proposed expansion, UM's total zinc smelting capacity would be approximately 320,000 t/yr (Metal Bulletin, 2000f).

UM planned an expansion of battery raw materials capacity that would approximately double production of zinc powders for alkaline batteries. UM would not give an estimated figure for the planned increased capacity at the plant. The reason for the expansion was the continued growth of alkaline batteries and increased demand for zinc powder (Metal Bulletin, 2000e).

Sidmar NV completed construction of its two hot-dip galvanizing lines at its Ghent steelworks. The first line has a capacity of 400,000 t/yr, and the second line has a capacity of

240,000 t/yr. The first line will specialize in automotive applications. The second line will produce thin gauge strip to supply the packing and construction sectors. The lines were built adjoining the facility's existing cold-rolling shop, and went on-stream in mid-2000. The project was the latest in a series of expansion plans by the Acieries Reunies de Burbach-Eich-Dudelang (ARBED) affiliates in the production of galvanized sheet. Sidmar and Hoogovens IJmuiden were also proceeding with plans to install a second line (Galtec 2) at Hoogovens' steelworks in the Netherlands (Metal Bulletin, 2000b).

Sidmar was planning to install a second continuous slab caster at its Ghent steel works along with relining its two blast furnaces. The new caster will have a capacity of 2 million metric tons per year and was due to be commissioned in the fourth quarter of 2001. The new caster will allow Sidmar to better meet the demands of its rolling mills and to move towards the production of value-added steels for the automotive industry. The expansion also means that Sidmar will no longer be a buyer of slabs (Metal Bulletin, 2000c).

After noting criticism, contained in a United Nations report on trade in illegal Angolan diamonds, that Antwerp has lax controls and regulations regarding importation of diamonds, the Diamond High Council (HRD) of Belgium, which acts as promoter and overseer of Antwerp's diamond trade, announced it would assist the Angolan Government to establish a system to curb illegal diamond trading. Antwerp was estimated to handle around 80% of the world trade in rough (uncut) diamonds and 50% of the world trade in polished stones (Mining Journal, 2000). According to HRD, Belgium's total diamond turnover in 2000 grew by nearly 9% to a record $25.8 billion, up from nearly $24 billion in 1999. This included a 16% increase in polished-stone sales overseas, from $5.2 billion to $6.1 billion in 2000. There was a slight rise in exports to the United States, which remained the main destination, taking almost 40% of Belgium's goods (Basel Magazine, 2001). The country's international trade in rough and in polished unmounted diamonds is listed in tables 3 and 4.

Belgium, which has been an important producer of marble for more than 2,000 years, was recognized for the diversity and quality of its dimension stone. The so-called petit granite, which is actually a dark blue-gray crinoidal limestone, was one of the most important facing stones the country produces. All the marble quarries are in Wallonia. Red, black, and gray are the principal color ranges of the marble, most of which is exported.

When the last Belgian coal mines closed in 1992, the country became entirely dependent on imported primary energy. Belgium imported coal to meet the needs of the steel, cement, and power-generating industries and imported all its crude oil for its four petroleum refineries. Belgium's seven nuclear powerplants supplied more than 60% of its electricity needs. Natural gas, which was considered to be more environmentally acceptable as a fuel, has begun to play a more important role as an energy source. With Belgium at the center of the European gas grid, the country was favorably located for obtaining natural gas.

Corporate restructuring and the government policy of budget cuts, split between the Federal Government and the regional authorities of Flanders and Wallonia, were expected to make Belgian products more competitive in the world market. The export-oriented Belgian industries rely heavily on the markets of its trading partners; when these partners' profits and cashflow increase, Belgium's economy will also experience positive results because it will be able to export more of its products.

LUXEMBOURG

In 2000, Luxembourg's mineral industry consisted principally of raw materials processing, information systems, and mineral trading.

As a member of the BLEU, trade statistics for Luxembourg are inextricably linked with those of Belgium and, therefore, cannot be listed individually. The iron and steel industry was Luxembourg's most important mineral industry sector, with steel being the country's main export commodity.

ARBED dominated the mineral industry and was the major producer of pig iron, crude steel, and stainless steel, all from imported material. The company specialized in the production of large architectural steel beams. The company was also involved in other areas of the economy, such as the cement and brickmaking industries. ARBED's domestic and foreign subsidiaries had interests in steelmaking and steel products, cement, copper foil production, engineering, and mining.

Mining in Luxembourg was represented by small industrial mineral operations that produced material for domestic consumption. These minerals included dolomite, limestone, sand and gravel, and slate (table 1). Luxembourg's principal producers of mineral industry products are listed in table 5.

ARBED shut down the 900,000 t/yr electric-arc furnace at Esch-Belval, and it was unlikely to restart before yearend. The shutdown was the result of faulty pollution-control equipment. Rolling mills at the plant remained in operation and were supplied with semis from other group steelworks. The Belval plant produces sections and sheet piling (Metal Bulletin, 2000a).

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Major Sources of Information

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Rue de Louvain 44
1000 Brussels, Belgium
Service Geologique de Belgique
Rue Jenner 13
1040 Brussels, Belgium
Service Central de la Statistique et des Études Economiques (STATEC)
6 Boulevard Royal
2013 Luxembourg

TABLE 1
BELGIUM AND LUXEMBOURG: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 e/
BELGIUM 3/					
Metals:					
Aluminum, secondary including unspecified metals e/	3,000	2,000	1,000	1,000	1,000
Arsenic, white e/	2,000	2,000	1,500	1,500	1,500
Bismuth metal e/	800	800	700	700	700
Cadmium, primary	1,580 e/	1,420	1,318	1,400 e/	1,400
Cobalt, primary e/	1,000	1,200	1,200	950	1,110 3/
Copper:					
Blister: e/					
Primary	3,500	2,000	--	--	--
Secondary	153,800	141,000 r/	138,000 r/	143,300 r/	164,700 3/
Total	157,300	143,000 r/	138,000 r/	139,000 r/	164,700 3/
Unwrought, total primary and secondary including alloys	425,703	467,494	482,992	485,000 e/	485,000
Refined, primary and secondary, including alloys	386,000	373,000	368,000	388,000 e/	423,100 3/
Iron and steel:					
Pig iron thousand tons	8,628	8,077	8,619 r/	8,431 r/	8,472 3/
Ferroalloys, electric furnace, ferromanganese e/	25,000	25,000	20,000	20,000	20,000
Steel:					
Crude thousand tons	10,773	10,738	11,617	10,931 r/	11,635 3/
Hot-rolled products do.	10,963	12,047	12,195 r/	12,780 r/	13,689 3/
Lead, refined:					
Primary e/ 5/	89,800	84,400	74,300	82,900	98,000
Secondary 6/	31,000 e/	26,400	17,200	20,300	20,000
Total e/	121,000	111,000	91,500	103,000 r/	118,000
Selenium e/ thousand tons	250	250	200	200	200
Tin metal, secondary including alloys e/	3,000	3,000	2,500	8,100 r/	8,500
Zinc:					
Slab:					
Primary	207,000 r/ e/	213,600	205,000	230,500	224,000
Secondary (possibly remelted zinc) e/	27,000	30,000	30,000	28,000	28,000
Total e/	234,000	243,600 r/	235,000	259,000	252,000
Powder	36,000	36,000	30,000	30,000 e/	30,000
Industrial minerals:					
Barite e/	30,000	30,000	40,000	30,000	30,000
Cement, hydraulic thousand tons	7,857	8,052	8,000 e/	8,000 e/	8,000
Clays, kaolin e/ do.	300	300	300	300	300
Lime and dead-burned dolomite, quicklime e/ do.	1,800	1,750	1,750	1,750	1,750
Nitrogen, N content of ammonia e/ do.	750	750	756 4/	850	863 4/
Sodium sulfate e/ do.	250	250	250	250	250
Stone, sand, and gravel: e/					
Calcareous:					
Alabaster	1,144 4/	1,151 4/	1,200	1,200	1,200
Dolomite thousand tons	3,379 4/	3,466 4/	3,500	3,500	3,500
Limestone do.	33,000	30,000	30,000	30,000	30,000
Marble:					
In blocks cubic meters	275	300	300	300	300
Crushed and other	100	100	100	100	100
Petit granite (Belgian bluestone):					
Quarried thousand cubic meters	1,200	1,200	1,000	1,000	1,000
Sawed do.	100,000	100,000	100,000	100,000	100,000
Worked do.	15,000	15,000	15,000	15,000	15,000
Crushed and other do.	800,000	800,000	800,000	800,000	800,000
Porphyry, all types thousand tons	4,000	4,000	4,000	4,000	4,000
Quartz and quartzite	500,000	500,000	500,000	500,000	500,000
Sandstone:					
Rough stone including crushed thousand tons	2,400	2,400	2,400	2,400	2,400
Paving	15,000	14,000	14,000	14,000	14,000
Sand and gravel:					
Construction sand thousand tons	9,000	9,000	8,500	8,500	8,500
Foundry sand	500,000	500,000	500,000	500,000	500,000
Dredged sand thousand tons	2,300	2,300	2,000	2,000	2,000
Glass sand do.	1,900	1,900	1,800	1,800	1,800
Other sand do.	2,800	2,800	2,800	2,800	2,800

See footnotes at end of table.

TABLE 1--Continued
BELGIUM: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
BELGIUM 3/						
Industrial minerals--Continued:						
Stone, sand, and gravel--Continued: e/						
Sand and gravel--Continued:						
Gravel, dredged	thousand tons	5,000	5,000	5,000	5,000	5,000
Sulfur, byproduct: e/						
Byproduct:						
Elemental		243,000	250,000	248,000	228,000	230,000 4/
Other forms		163,000	180,000	180,000	180,000	180,000 4/
Total		406,000	430,000	428,000	408,000	410,000 4/
Sulfuric acid, oleum	thousand tons	2,000	2,000	2,000	2,000	2,000
Mineral fuels and related materials:						
Carbon black e/		1,500	1,500	1,000	1,000	1,000
Coke, all types	thousand tons	3,550	3,401	3,400 e/	3,400 e/	3,400
Gas, manufactured	thousand cubic meters	422,412	372,095	375,000 e/	375,000 e/	375,000
Petroleum refinery products: e/						
Liquefied petroleum gas	thousand 42-gallon barrels	13,321 4/	13,607 4/	14,000	14,000	14,000
Naphtha and white spirit	do.	10,710 4/	13,354 4/	13,000	13,000	13,000
Gasoline	do.	50,549 4/	57,979 4/	60,000	60,000	60,000
Jet fuel	do.	13,000	13,000	13,000	13,000	13,000
Kerosene	do.	600	600	600	600	600
Distillate fuel oil	do.	85,000	85,000	85,000	85,000	85,000
Refinery gas	do.	3,500	3,500	3,500	3,500	3,500
Residual fuel oil	do.	46,286 4/	51,244 4/	50,000	50,000	50,000
Bitumen	do.	4,677 4/	5,766 4/	5,000	5,000	5,000
Other	do.	8,500	8,500	8,500	8,500	8,500
Refinery fuel and losses	do.	12,000	12,000	12,000	12,000	12,000
Total	do.	248,000 r/	264,000 r/	265,000	265,000	265,000
LUXEMBOURG 7/						
Metals:						
Iron and steel, metal:						
Pig iron		829,000	437,000	--	--	--
Steel:						
Crude		2,501,000	2,580,000	2,478,000	2,427,000 r/	2,571,000 4/
Semimanufactures		2,313,000	2,466,000	2,517,000	2,775,000 r/	3,019,000 4/
Industrial minerals:						
Cement, hydraulic		666,771 r/	650,000 r/ e/	650,000 r/ e/	600,000	600,000
Gypsum and anhydrite, crude e/		400	400	400	400	400
Phosphates, Thomas slag: e/						
Gross weight		500,000	500,000	475,000	475,000	475,000
P_2O_5 content		75,000	75,000	70,000	70,000	70,000

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes data available through March 2001.

3/ In addition to the commodities listed, Belgium produced a number of other metals and alloys for which only aggregate output figures were available.

4/ Reported figure.

5/ Data not reported; derived by calculating reported total lead output plus exports of lead bullion minus imports of lead bullion.

6/ Data represent secondary refined lead output minus remelted lead. As such, the figures are probably high because they include some lead that was sufficiently pure as scrap that did not require remelting, but data are not adequate to permit differentiation.

7/ Construction materials, such as dimension stone and sand and gravel, are also produced, but the amounts are no longer reported, and no basis exists for the formulation of reliable estimates of output levels.

TABLE 2
BELGIUM: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cadmium, metal	metric tons	Union Minière (Sté. Générale de Belgique, 50.2%)	Balen	1,800
Cement		Major companies:		8,400
				Of which:
		Cimenteries CBR SA (Sté. Générale de Belgique)	Plants at Lixhe, Mons/Obourg, Harmignies, Marchienne, Ghent, and others	(3,200)
		Ciments d'Obourg SA	Plants at Obourg and Thieu	(2,800) 1/
		Compagnie des Ciment Belge (Ciments Francais)	Plant at Gaurain-Ramecroix	(2,400)
Cobalt		Union Minière (Sté. Générale de Belgique, 50.2%)	Refinery at Olen	500
Copper		do.	Smelter at Antwerp-Hoboken	50
Do.		do.	Refinery at Olen	330
Do.		Metallo-Chimique NV	Smelter at Beerse	80
Dolomite		SA Dolomeuse (Group Lhoist)	Quarry at Marche les Dames	500
Do.		do.	Plant at Marche les Dames	750
Do.		SA de Marche-les-Dames (Group Lhoist)	Quarries at Namèche	3,000
Do.		do.	Plant at Namèche	3,000
Do.		SA Dolomies de Merlemont (Group Lhoist)	Quarry at Philippeville	100
Lead, metal		Union Minière (Sté. Générale de Belgique, 50.2%)	Smelter at Antwerp-Hoboken	90
Do.		do.	Refinery at Antwerp-Hoboken	125
Limestone		Carmeuse S.A. (Long View Investment NV)	Mines and plant at Engis	1,850
Do.		do.	Mines and plant at Frasnes	450
Do.		do.	Mines and plant at Maizeret	850
Do.		do.	Mines and plant at Moha	800
Do.		SA Transcar (Royal Volker Stevin)	Mines and plant at Maizeret	850
Petroleum, refined	42-gallon barrels per day	Refineries:		712,000
				Of which:
		Fina Raffinaderji Antwerp	Refinery at Antwerp	(268,000)
		SA Esso NV	do.	(239,000)
		Belgian Refining Corp.	do.	(80,000)
		Nynas Petroleum NV	do.	(125,000)
Salt		Zoutman NV	Plant at Roeselare	200
Steel:		Companies:		14,000
				Of which:
		Cockerill Sambre SA (Government of Wallonia, 80%)	Plant at Liège and Charleroi	(5,000)
		Sidmar NV (Government of Belgium, 28.24%; ARBED in Luxemburg, 71.76%)	Plant at Ghent	(3,960)
		Usines Gustave Boël NV	Plant at La Louviere	(2,020)
		Forges de Clabecq SA	Plant at Clabecq	(1,500)
		SA Fabrique de Fer de Charleroi	Plant at Charleroi	(600)
		ALZ NV	Plant at Genk-Zuid	(360)
		New Tubemeuse (NTW) SA	Plant at Flemalle	(300)
Zinc, metal		Union Minière (Sté. Générale de Belgique, 50.2%)	Smelter and refinery at Auby and Balen	450

1/ Includes the capacity of the company SA Ciments de Haccourt.

TABLE 3
BELGIUM: EXPORTS AND REEXPORTS OF DIAMOND 1/

Grade	1999 Quantity (thousand carats)	1999 Value (millions)	2000 Quantity (thousand carats)	2000 Value (millions)
Worked, but not mounted or set	7,533	$4,283	8,590	$5,801
Natural rough, unsorted, and unworked or bruted	173,262	5,638	136,498	6,603
Industrial	8,292	35	12,990	43
Dust	4,426	2	5,877	3
Synthetic	51,174	30	58,661	37
Total	244,687	9,988	222,616	12,487

1/ Where necessary, values have been converted from Belgian francs (BF) to U.S. dollars (US$) at the rate of BF46.01=US$1.00.

Source: Ministére des Affaires Economiques, Carreffour de l'Economie, Brussels, Belgium, June 2001, v. 2001/6A, p. 11.

TABLE 4
BELGIUM: IMPORTS OF DIAMOND 1/

Grade	1999 Quantity (thousand carats)	1999 Value (millions)	2000 Quantity (thousand carats)	2000 Value (millions)
Worked, but not mounted or set	7,344	$3,484	8,262	$4,861
Natural rough, unsorted, and unworked or bruted	149,687	5,789	125,010	7,025
Industrial	34,019	55	27,221	41
Dust	3,485	11	5,476	1
Synthetic	71,434	40	74,827	48
Total	265,969	9,379	240,796	11,976

1/ Where necessary, values have been converted from Belgian francs (BF) to U.S. dollars (US$) at the rate of BF46.01=US$1.00.

Source: Ministére des Affaires Economiques, Carreffour de l'Economie, Brussels, Belgium, June 2001, v. 2001/6A, p. 11.

TABLE 5
LUXEMBOURG: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	SA des Ciments Luxembourgeois (ARBED, 50%; SGB, 25%)	Plant at Esch-sur-Alzette	450
Do.	Intermoselle SARL (ARBED, 33%)	Plant at Rumelange	1,000
Steel	Acieries Reunies de Burbach-Eich-Dudelang (ARBED) [Belgian Government (31%) and others]	Plants at Differdange, Dudelange, Esch-Belval, and Esch-Schifflange	5,320

THE MINERAL INDUSTRIES OF

BULGARIA AND ROMANIA

By Walter G. Steblez

The northeastern region of the Balkan Peninsula, comprising Bulgaria and Romania, borders the Black Sea to the east, Ukraine and Moldova to the north, Greece and Turkey to the south and southeast, Macedonia and Serbia and Montenegro to the west, and Hungary to the northwest. The Danube River forms a natural boundary between Bulgaria in the south and Romania in the north. Bulgaria is encompassed within the Mediterranean Alpine folded zone, which comprises the Carpatho-Balkan branch to the north and the Dinaric-Hellenic branch to the south (Bogdanov, 1982). The Carpatho-Balkan branch also constitutes the primary folded zone in Romania, incorporating the eastern and southern Carpathian Mountains as well as the Apuseni Mountains within the Carpathian arc to the west of the Transylvanian Plateau (Ianovici and Borcoş, 1982).

Mining and metalworking in this region has a long history that was well documented by Roman times, when Bulgaria and Romania, respectively known as Thrace and Dacia, were important sources of base and precious metals. Gold and nonferrous metals mined in this region remain attractive investment opportunities to foreign investors.

BULGARIA

Bulgaria's minerals industry comprised the mine output of ferrous and nonferrous metals, mineral fuels (mainly coal), and such industrial minerals as clays, gypsum, and rock salt. Additionally, the metallurgical branch smelted and refined copper, gold, iron and steel, lead, silver, and zinc. Cement, dimension stone, and other construction materials also were produced. On a world scale, however, Bulgaria's minerals industry was small and only of regional importance. Although most of the country's minerals requirements were met through domestic production, the country continued to depend on imports of iron ore, steel, and mineral fuels.

The Government remained committed to transforming the economy to a market-based economic system. The Law on Transformation and Privatization of State and Municipal-Owned Enterprises was enacted by Parliament in 1992 and the Underground Resources Act was enacted in 1998 to promote private enterprise and foreign investment. Although the act stipulates that underground mineral wealth is the property of the state, it provides for claims by domestic and foreign companies for the development and operation of mineral deposits for up to 35 years with additional 15-year extensions to be approved. Exploration rights to private companies could be granted for up to 3 years (Kousseff, 1999). In addition, the National Program for Sustainable Development of Mining in Bulgaria was drafted and approved in 1998. The Government continued to work to improve the country's environmental condition. In 2000, this included obtaining a loan from the World Bank amounting to \$47 million[1] earmarked for environmental cleanup. Targeted enterprises included the Burgas-based Neftochim petroleum refinery. The funds were to be distributed over a 3-year period (Oil and Gas Journal, 2000).

Bulgaria's economy in 2000 showed gains as the gross domestic product (GDP) registered a growth rate of 5% compared with that of 1999. Industrial production, which accounted for 29% of the GDP, registered a marked growth rate of about 10.8% (U.S. Central Intelligence Agency, 2001a). According to the European Bank for Reconstruction and Development (2001, p. 23), industry also contributed about 10% of the country's total value of exported goods in 2000. Improvement in Bulgaria's economic performance at the end of the 1990s—which saw a significant shift away from economic uncertainties during the transition from central economic planning—and the improving political stability in the Balkans generated net foreign investment in 2000 of about \$1 billion, which was about one-third greater than that of 1999. Foreign investor confidence in the legal underpinnings of the country's growing privatization process was another important factor that contributed to the increase in direct foreign investment.

Metals

Metals have been a substantial component of the mineral industry's production. Bulgaria's mine output includes copper, iron, lead and zinc, and manganese. Additionally, byproduct gold, silver, molybdenum, and other metals have been produced, chiefly from the processing of copper and lead and zinc ores.

In early 2000, Navan Resources plc of Ireland obtained a new exploration license for gold in southeastern Bulgaria. This area was considered "highly prospective" and would add to Navan's other interests in Bulgaria that included a 92% interest in the Chelopech gold and copper mine. The new Krumovgrad exploration license extends over a 130-square-kilometer (km^2) area near the Greek border. The region was already known for the presence of epithermal gold mineralization. Surnak Central, one of the prospects in this region drilled earlier by the Government of Bulgaria, showed 5.2 grams per metric ton (g/t) gold at a depth of 89.9 meters (m). Overall, the deposit showed 110 million metric tons (Mt) of ore grading 2.2 g/t gold and 8.8 g/t silver.

Navan's other activities in Bulgaria were in western Srednegoria where exploration revealed promising copper mineralization at Pozharevo. Malachite/azurite/chalcopyrite deposition was discovered in veins and fractures in altered volcanics during trenching of outcrops in 1999. Drill core analysis revealed copper values varying from 1% to 3.2%. There also was substantial evidence of gold mineralization near the surface that might allow open pit copper and gold mining (Skillings Mining Review, 2000).

Other important events concerning gold exploration in Bulgaria included the winning of a tender for an exploration license by Hereward Ventures plc of the United Kingdom.

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[1] Where necessary, values have been converted from euros (€) to U.S. dollars at the rate of €0.94=US\$1.00.

About 30 kilometers (km) south of Sofia in the Pernik area, the Dikanyite license extends over a 117-km^2 area, which also was a gold-producing area in antiquity. Gold mineralization is believed to be associated with shear zones (Mining Journal, 2000d).

In midyear, Union Minière Pirdop Copper (Pirdop) contracted Lurgi Metallurgie of Germany to provide Pirdop with upgraded equipment that would meet the environmental standards of the European Union (EU). The overhaul would take place over a 24-month period and would be the last stage of the plant's investment program to achieve an output of 185,000 metric tons per year (t/yr) of copper anode and 45,000 t/yr of cathode. Lurgi Metallurgie would supply new steam-heated dryers with dust abatement capability, upgrade existing electrostatic precipitators, provide new primary and secondary hoods at the converters, and modernize existing wet gas cleaning systems. A new tailings pond also was to be provided along with upgraded slag flotation units. The completion of this work was planned for 2002 (Union Minière S.A., 2000). In 2000, Pirdop posted a 74% increase in the production of anode and a 55% increase in the output of cathode. Almost 75% of the anode (containing associated precious metals) was exported to Belgium; the balance was earmarked for domestic use. The Asarel-Medet mining and beneficiation complex, which was privatized in 1999 through a management-employee buyout, supplied most of the copper ore and concentrate for Pirdop (European Bank for Reconstruction and Development, 2001, p. 23).

Other developments in Bulgaria's copper industry in 2000 included plans by Halkor S.A., a Greek copper processing concern, to upgrade idle capacity at KOCM AD, a Sofia-based enterprise for manufacturing rolled copper products and alloys. Halkor acquired KOCM through its Bulgarian subsidiary Sofia Copper AD for $64 million. Halkor further announced plans to close down one of its facilities in Greece and transfer production to Bulgaria (Mining Journal, 2000e).

In early 2000, the Privatization Agency of Bulgaria continued its offering for sale 80% of KCM SA, the country's producer of lead and zinc. Although the offering was considered by a number of bidders, the only actual bid was made by KCM's own management (Metal Bulletin, 2000g). An earlier bid in 1999 by Mes Metals of Turkey failed because of the inability of Mes to meet sale conditions (Mining Journal, 1999a, b). According to the Privatization Agency of Bulgaria, the sale of KCM to the management-operated commercial entity went into effect in July. The company was renamed KTZM 2000. The terms of the transaction specified an initial payment amounting to 10% of the total $14.6 million sale price; the balance would be spread over the subsequent 10 years. Additionally, KTZM agreed to invest about $10 million by 2003 (Mining Journal, 2000c).

Additional developments in Bulgaria's nonferrous metals sector included the establishment of Steelmet (an aluminum section plant) as a joint venture between Viohalko S.A. of Greece and Metalsnab Holding of Bulgaria. Viohalko further acquired nonferrous metal producer Sofia Met with a production capacity of 7,000 t/yr of fabricated nonferrous metals. Viohalko planned to sell 30% of Sofia Met's output on the domestic market; the balance would be exported to the EU, member countries of the Commonwealth of Independent States, as well as to other Balkan countries (European Bank for Reconstruction and Development, 2001, p. 23).

Bulgaria's production of crude steel, which amounted to slightly more than 2 Mt, increased by about 6.9% in comparison with that of 1999. The country's steel output was centered at two plants—Kremikovtzi in the Sofia region and Stomana at Pernik. The chief event in the iron and steel sector in 2000 was the Government's approval of a bid on a 6-month contract to manage Stomana AD by a consortium comprising Eurometal of Bulgaria and Metal Traders of Germany. A $35 million plan by the consortium to modernize and restructure Stomana in exchange for a buyout for $13 million at the end of the management contract period reportedly was proposed (Metal Bulletin, 2000h).

Bulgaria, which like Romania had enjoyed a burgeoning scrap steel export market, experienced a sharp export decline in 2000, mainly owing to an inability to compete with very large quantities of similar quality steel exported from Russia. Much of the slack in Bulgaria's scrap steel exports, however, was taken up by growing domestic demand (Metal Bulletin, 2000j).

Industrial Minerals

The growth of foreign investment at the end of the 1990s resulted in substantial foreign ownership in Bulgaria's cement industry. Major investment came from the EU and included Italcementi (Devnya Cement), Heidelberg Zement AG (Zlatna Panega Cement), and Holderbank (Beloizvorski Cement). To facilitate exports to the EU, in October, the Government adopted legislation to establish EU standards for the construction materials and cement sector (European Bank for Reconstruction and Development, 2001, p. 23).

Mineral Fuels

Bulgaria is endowed with large, albeit low-rank, resources of coal. The country's reserves of lignite amount to 2.5 billion metric tons (Gt); those of subbituminous coal, to 200 Mt. In 1998, the "Action Plan for Coal Mining Companies" for the 1998-2001 period was published by the Government of Bulgaria. The plan called for the closure of inefficient mines, followed by free-market pricing of coal and the denationalization of the coal mining industry. The plan also called for the investment of $437 million to improve the coal mining sector, which would include the introduction of new technology to the industry, facility modernization, and mined-out land reclamation (U.S. Department of Energy, 1999, p. 3-4). A substantial portion of the country's thermal electric powerplants, which produce more than one-half of the country's total production of about 45 billion kilowatts, operate on domestic coal.

Bulgaria also produced small quantities of crude petroleum from nine oil wells. Output in 2000 amounted to about 41,000 metric tons (t). Virtually all Bulgaria's crude oil needs are met through imports. More recently, however, Bulgaria sought the participation of foreign companies to jointly explore for oil and gas in the Black Sea and in the Black Sea coastal areas; Austrian, British, and United States companies are participating in this effort (U.S. Department of Energy, 1999, p. 1).

ROMANIA

Romania's production of metals (aluminum, copper, lead and zinc, manganese, and steel and ferroalloys), industrial minerals, and mineral fuels was mainly of regional importance. In the metals sector, production results for 2000 continued to show production losses for primary copper metal; mine production of lead and zinc as well as crude steel output, however, showed some recovery during the year (table 1). In 2000, the country's economy appeared to rebound from its decline in 1999. The GDP rose by 2.2%, and industrial production increased by 8% (U.S. Central Intelligence Agency, 2001b.).

Metals

Production of primary aluminum at Alro SA rose by about 3% compared with the 1999 level of output. Domestic sales were expected to amount to about 43,000 t; exports would amount to more than 130,000 t. In addition to continuing capital projects valued at $5.49 million, new investment for facility modernization for 2000 amounted to $14.85 million. Privatization plans continued to advance in part because of a contract that was signed by the State Ownership Fund (majority shareholder of Alro) and Paribas Corporate Finance Co. of France, which designated the latter as consultant for the planned privatization process (American Metals Market 2000). The privatization of the aluminum industry was to entail the issuance of international tenders for a 59.7% stake in Alro and a 69.9% stake in Romania's aluminum rolling mill ALPROM SA (Metal Bulletin, 2000l).

Romania mined copper largely in two districts—the northeastern part of the country that included mines at Baia Sprie, Cavnic, and Lesul Ursului, and in the southwestern part of the country with major mines at Moldova Noua, Rosia Poieni, and Rosia Montana. Generally, the grade of ore has been low, with major producing mines (Moldova Noua and Rosia Poieni) hoisting ore grading about 0.35% copper or less. Concentrates from these areas have been smelted and refined at Baia Mare and Zlatna. Compania Nationala REMIN S.A. operated an Outokumpu flash smelter, an electrolytic copper refinery, and a continuous caster at Baia Mare and an Outokumpu flash smelter and an electrolytic refinery at Zlatna to process copper concentrates (Serjeantson, 1995).

Relatively low-grade lead and zinc ore was produced at underground mines in the Baia Mare, Borsa, Certej, and Rodna Districts, grading from 0.4% lead and 0.6% zinc to 1.0% lead and 1.2% zinc. Moreover, Romania's lead and zinc ores also contained copper (0.35%) as well as associated antimony, bismuth, cadmium, gold, and silver. Metal recovery in concentrate reportedly has ranged between 50% and 75% for lead and zinc. Smelting and refining of lead and zinc from domestic and imported ores and concentrates was carried out at Sometra S.A.'s (formerly Intreprinderea Metalurgica de Metale Neferoase) Imperial Smelter at Copsa Mica, which had capacity to produce about 42,000 t/yr lead and 66,000 t/yr zinc.

Aurul S.A. [owned by Esmeralda Exploration Ltd. (50%) and REMIN S.A. (44.8%)], which was a joint stock company registered in Romania to process gold-bearing tailings, experienced considerable difficulties in early 2000 on the environmental front. Spillage of about 100,000 cubic meters of waste liquid from a tailings pond in the Baia Mare region was recorded on January 30 of an undetermined level of toxins (cyanide and heavy metals). Company officials indicated that the spillage was the result of unusually high rain and snow fall and not because of any structural defects in the dam (Metal Bulletin, 2000d). A United Nations inspection team found a number of critical points concerning the construction of the dam including the retransmission of decant water from the new pond back to the old Meda pond with elevated cyanide levels and insufficient capacity at the new pond itself to store safely processed limes and unexpected large quantities of water (Mining Journal, 2000a).

In June, the Government of Romania approved the resumption of Aurul's tailings processing operation at Baia Mare. Aurul indicated that modifications were made to installations and equipment to handle potential future overflows. These included pumps to entraine excess water from the tailings dam to a separate dam during emergencies. Plans also called for the future installation of a cyanide detoxification plant (Mining Journal, 2000b). The resumption of the tailings processing operation was to undergo an initial testing period; a new environmental impact statement would be issued and final assessment made. Aurul was expected to make an application for a full operating permit in September (Metal Bulletin, 2000c). The recovery of gold was expected to amount to about 1.6 t/yr; silver, about 9 t/yr.

In early 2000, Euro Gold S.A. (a joint venture of Gabriel Resources Ltd. and Minvest S.A.) announced the result of a prefeasibility study received in late 1999 from Pincock Allen and Holt of the United States concerning the joint venture's Rosia Montana gold properties. The study was based on $300 per troy ounce gold and $5 per troy ounce silver prices. The study suggested a 10-million-metric-ton-per-year (Mt/yr) open pit mining operation that would produce about 12.8 t/yr gold (reported as 411,000 troy ounces per year) at a $113 per troy ounce production cost. Total exploitable resources were estimated to contain about 250,000 kilograms (8 million troy ounces) of gold and about 1.5 million kilograms (49 million troy ounces) of silver (Mining Magazine, 2000). Having received a completed prefeasibility study, Gabriel was allowed to increase its stake in Euro Gold to 80% from 65%, per the joint-venture agreement, which it did. By yearend, Rosia Montana's resources showed an overall increase of gold to 12.2 million troy ounces from 8.65 million troy ounces (Northern Miner, 2000b). Among related issues, the Government of Hungary sought compensation for damages for alleged environmental degradation to rivers and streams extending to its territory amounting to $180 million. The sought-for funds would be used for reclamation of affected areas (Metal Bulletin, 2000f).

Romania's Barza Brad gold mine was the focus of interest by Exall Resources Ltd. of Canada, which undertook a due diligence review of the facility. Minvest (a major state-owned mining entity) operated the mine in 2000. A prefeasibility study would entitle Exall to acquire 80% of the Barza Brad Mine, in which case Minvest would share the balance (20%) with minority Romanian shareholders. The due diligence review included airborne electromagnetic and radiometric surveys covering a 12 km^2 area conducted on 150-m line spacings. Independent mine review work by Watts Griffis & McQuat was to follow (Northern Miner, 2000a).

In early 2000, the Government of Romania announced plans to conduct discussions with authorities in India about increasing India's exports of iron ore and flat rolled steel products to Romania. India reportedly supplied about 300,000 t of Romania's consumption of 6.5 to 7.5 Mt/yr of iron ore; the amount India supplied could be increased to 1.5 Mt. Most iron ore exports to Romania derive from Russia, South Africa, and Ukraine (Metal Bulletin, 2000a).

Sidex S.A., reportedly the largest producer of steel in Romania, reported a substantial drop in crude steel production in 1999 compared with 1998 output (to 3.2 Mt from 4.71 Mt). A drop in domestic demand during the latter part of the year and a shortage of working capital needed for raw material purchases were among the factors that were attributed to the production decline. Another factor was the continuing blockage of the Danube in the aftermath of the Kosovo conflict, which added an additional charge of $8 to $12 per ton on a cost, insurance, freight basis, as well as the European Commission's increased duties on Romanian steel plate (Metal Bulletin, 2000n). In midyear, in an effort to boost steel production, Sidex restarted its fourth blast furnace. As a result, the output of steel would be raised by about 3,000 metric tons per day (t/d) to about 13,000 t/d. A fifth blast furnace was scheduled to restart at yearend 2000 (Metal Bulletin, 2000m).

The Max Aicher steel group of Germany (Max Aicher Bau GmbH & Co. Kg) announced the acquisition of Lamdro SA, a bar mill in Drobeta Turnu, by purchasing 99.57% of the shares of stock. The mill, which had capacity of 400,000 t/yr, would be part of Aicher's assets and would enable the company to engage in major postwar reconstruction efforts in the Balkans (Metal Bulletin, 2000a). Additionally, the Max Aicher group expressed interest in CSR SA Reşiţa in Caras-Severin County, following the State Privatization Agency's (SOF) offering of 94.5% of Reşiţa's shares for sale. Noble Ventures (a consortium of U.S. interests based in South Carolina) also expressed interest in the offering (Metal Bulletin, 2000b). Reşiţa, an open hearth steelmaker, had a 500,000 t/yr rolling capacity. The SOF also offered a 99.1% share of Republica SA, a pipe and tube mill with a capacity of 90,000 t/yr, for sale. In preparation for the sale, Republica reported having reduced its work force to 1,800 employees from 3,000 employees during the previous 18-month period (Metal Bulletin, 2000k).

Another issue during the year involved a dispute between the owners/managers of Gavazzi Steel SA (formerly, the Otelul Rosu steelworks; then, Societ Com Socomet SA; later, Easteel Siderurgica Romana SA Otel Rosu) and the SOF concerning the payment schedule drafted in the sale agreement. Differences of interpretation on the payments provisions were at issue, especially in regard to surcharges for inflation allegedly added by the SOF. Gavazzi management, however, indicated that its planned $17 million initial investment to modernize the facility was to continue. The total investment was to amount to about $60 million (with financial assistance from the European Bank for Reconstruction and Development) to be spent during the 2000-2005 period. The initial investment would include the addition of a new 300,000 t/yr electric arc furnace (EAF) supplied by Tehint of Italy, which would replace three older EAFs. The subsequent planned investment phase would see the addition of two new rolling mills (Metal Bulletin, 2000e).

Mineral Fuels

The petroleum extraction, production, and refining industry historically has been among Romania's leading industrial sectors. Although small by world standards, the petroleum industry continued to be an important component of the country's energy balance. Estimates of petroleum resources have ranged from 1.0 to 1.6 Gt. The extraction of crude petroleum in recent years, however, has exhibited a declining trend. In 1996, 1997, 1998, and 1999, petroleum output declined by 3%, 2%, 3%, and 2%, respectively, compared with the preceding year (table 1). In 2000, petroleum production decreased by about 2% compared with that of 1999; however, a small increase in petroleum production in the near future was anticipated owing to the opening of 15 petroleum and natural gas blocks in 1996 for exploration by such foreign oil companies as Amoco of the United States, Royal Dutch Shell o the Netherlands, and Enterprise Oil of the United Kingdom (Lynch, 1999, p. 2). The country's refined petroleum products capacity amounted to about 25 Mt/yr. Major events in the petroleum and natural gas sector in late 1999 included the linkage of Romania's natural gas transportation system with tha of Ukraine. The state-owned gas company Romgaz would receive Russian gas through the linkage to increase energy supplies to the northern part of the country.

A feasibility study undertaken by experts from Romania and the United States reached a conclusion that a 1,400-km petroleum pipeline linking Constanta and Trieste was feasible. The proposed pipeline's designed carrying capacity would be 47.1 Mt/yr. The projected completion date of the pipeline would be in the third quarter of 2002 at a cost of $1 billion with an additional sum of $300 million projected for improvements during the initial 10 years of the pipeline's operation. The pipeline would be in the position to carry crude petroleum originating in the Caspian Sea producing area to Trieste where linkage with the Trans-Alpine Pipeline would be possible (Petroleum Economist, 2000).

Coal was produced at 34 mines from resources amounting to 3.5 Gt, of which 75% was lignite; 22%, bituminous coal; and 3%, brown coal. Coal accounted for about 60% of the primary fuel for the country's principal electric power stations (Lynch, 1999, p. 7).

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TABLE 1
BULGARIA AND ROMANIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000
BULGARIA 2/						
Metals:						
Aluminum, metal, secondary		4,417	3,127	3,500 e/	3,500 e/	3,500 e/
Bismuth, metal e/		40	40	40	40	40 e/
Cadmium, metal, smelter		250	280	250 e/	150 e/	150 e/
Copper:						
Ore:						
Gross weight	thousand tons	21,123	21,836	20,726	22,346	22,829 3/
Cu content e/	do.	106	109	105	113 r/	107 e/
Concentrate:						
Gross weight	do.	444	463	438	482 r/	462 3/
Cu content	do.	89	93	88	96 r/	92 e/
Metal, primary and secondary:						
Smelter		104,398	114,630	119,500	112,000	115,000 e/
Refined, electrolytically		22,301	34,530	36,400 r/	21,000 r/	32,500 3/
Gold, metal	kilograms	3,390	1,020	1,253 r/	2,743 r/	2,347 3/
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	1,000 e/	858	895	699	559 3/
Fe content	do.	282	242	250 e/	223 r/	178 3/
Iron concentrates	do.	497	479	463 r/	361	304 3/
Metal:						
Pig iron for steelmaking	do.	1,481	1,610	1,400	1,100	1,200 e/
Ferroalloys, ferrosilicon e/	do.	8	10	10	10	10 e/
Steel, crude	do.	2,457	2,628	2,240 r/	1,890 r/	2,020 3/
Semimanufactures, rolled	do.	1,901	2,242	1,800 e/	1,800 e/	1,900 e/
Lead:						
Mine output, Pb content		33,000	32,000 r/	22,000 r/	14,000 r/	14,000 3/
Concentrate:						
Gross weight		40,681	39,800	34,595	25,208 r/	15,019 3/
Pb content e/		28,500	27,900	24,200	17,000 r/	10,500 3/
Metal, refined, primary and secondary		74,690	73,000 r/	77,100 r/	81,600 r/	84,100 3/
Manganese ore:						
Gross weight		44,270	47,430	55,600	--	-- 3/
Mn content e/		13,100	14,000	17,000	--	--
Silver, mine output, Ag content		49	32	68 r/	59 r/	60 e/
Tin, metal		8	8	10 e/	10 e/	10 e/
Uranium, oxide, U content e/		600	600	600	600	600 e/
Zinc:						
Mine output, Zn content e/		25,700	21,000	18,000 r/	12,000	10,000 e/
Concentrate:						
Gross weight		38,000	38,420	33,600	19,560 r/	18,096 3/
Zn content e/		19,800	20,000	17,000	10,200	9,400 e/
Metal, smelter, primary and secondary		68,018	82,000 r/	86,100 r/	83,700 r/	84,200 3/

See footnotes at end of table.

TABLE 1--Continued
BULGARIA AND ROMANIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000
BULGARIA--Continued 2/						
Industrial minerals:						
Asbestos fiber, all grades		300	300	300 e/	300 e/	300 e/
Barite ore, run of mine		976,700	285,000	452,197	1,124,000 r/	8,747,000 3/
Cement, hydraulic	thousand tons	2,137	1,656	1,700 e/	1,700 e/	1,700 e/
Clays:						
Bentonite	do.	202	171	176	232	296 3/
Kaolin, washed	do.	189	150	150 e/	140 e/	150 e/
Refractory	do.	67	62	56	48	34 3/
Feldspar	do.	30	36	36 r/	28	22 3/
Fluorspar e/	do.	2 3/	2	2	2	2 e/
Gypsum and anhydrite:						
Crude	do.	169	156	184	149	170 3/
Calcined	do.	64	60	75 r/ e/	55 e/	65 e/
Lime, industrial	do.	991	849 r/	1,000 e/	1,068 r/	1,388 3/
Limestone and dolomite	do.	10,443	10,842	11,000 e/	11,000 e/	11,000 e/
Nitrogren, N content of ammonia	do.	1,194	982 r/	1,000 e/	1,000 e/	1,000 e/
Perlite	do.	26	20	12 r/	13	17 3/
Pyrites, gross weight e/	do.	150	150	150	150	150 e/
Salt, all types	do.	1,600	1,600	2,400	1,300	1,700 3/
Sand and gravel	thousand cubic meters	3,075	2,140	2,000 e/	2,000 e/	2,200 e/
Silica (quartz sand)	thousand tons	832	557	593	533	690 e/
Sodium carbonate, calcined	do.	800	800	800	800	800 e/
Sulfur: e/						
Sulfur content of pyrite		50,000	50,000	50,000	50,000	50,000 e/
Byproduct		50,000	50,000	50,000	50,000	50,000 e/
Total		100,000	100,000	100,000	100,000	100,000 e/
Sulfuric acid		524,714	550,700	500,000 e/	500,000 e/	500,000 e/
Mineral fuels and related materials:						
Coal, marketable:						
Anthracite	thousand tons	23	16	16	17	18 e/ 4/
Bituminous	do.	172	130	105	106	100 e/ 4/
Brown	do.	3,961	3,491	3,692	3,074	3,211 e/ 4/
Lignite	do.	28,101	26,929	27,435	22,696 r/	23,765 e/ 4/
Total	do.	32,257	30,566	31,248	25,893	27,094 e/
Coke	do.	1,157	1,239	1,200 e/	1,200 e/	1,200 e/
Natural gas, marketed	million cubic meters	42	38	33	27	15 e/ 4/
Petroleum:						e/
Crude, reported	thousand tons	34	28	32	39	41 e/ 4/
Refinery products e/	thousand 42-gallon barrels	25,000	25,000	25,000	25,000	25,000 e/
ROMANIA 4/						
Metals:						
Aluminum:						
Bauxite, gross weight		174,500	127,450	161,865	136,000 r/	135,000 e/
Alumina, calcined, gross weight		260,637	281,636	250,226	277,388	416,575
Ingot including alloys:						
Primary		140,874	162,987	174,038	174,100 r/	179,039
Secondary		3,678	2,042	1,110	205 r/	32
Total		144,552	165,029	175,148	174,305 r/	179,071
Bismuth, mine output, Bi content e/		40	40	40	40	40
Cadmium metal, smelter		5	5	--	--	--
Copper:						
Mine output, Cu content of concentrate		24,434	23,190	19,065	16,455 r/	16,079
Metal:						
Smelter:						
Primary		32,622	25,024	18,708	24,010	16,495
Secondary e/		1,000	1,000	1,000	2,000 3/	2,000
Total		33,622	26,024	19,708	26,010	18,495
Refined:						
Primary		29,305	22,912	21,008	20,893 r/	13,803
Secondary e/		5,000	4,000	2,000	4,000 4/	4,000
Total		34,305	26,912	23,008	24,893 r/	17,803
Gold, mine output, Au content e/	kilograms	500 r/	500 r/	500 r/	475 r/ 3/	500

See footnotes at end of table.

TABLE 1--Continued

BULGARIA AND ROMANIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000
ROMANIA--Continued 2/						
Metals--Continued:						
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	860	756 r/	459 r/	365 r/ e/	290 e/
Metal content	do.	140	147	85	69 r/	55
Metal:						
Pig iron	do.	4,025	4,557	4,541	2,969 r/	3,069
Ferroalloys:						
Ferrochromium		9,650	950	873	--	--
Ferrosilicon		23,827	9,620	5,553	-- r/	2,542
Ferromanganese		20,150	11,505	4,170	25	1,044
Ferrosilicomanganese		78,590	62,570	83,617	550	21,158
Silicon metal e/		300	300	150	100 r/	100 e/
Steel, crude	thousand tons	6,082	6,674	6,336	4,392 r/	4,770
Semimanufactures:						
Pipes and tubes	do.	591	633	661	351 r/	462
Rolled products	do.	4,479	4,804	4,391	3,379 r/	3,685
Lead:						
Mine output, Pb content of concentrate		21,356	19,447	15,128 r/	17,489 r/	18,744
Smelter, primary e/		12,000	10,000	10,000	15,000	15,000
Refined: e/						
Primary		20,000	18,000	20,000	18,000 r/	27,000
Secondary		4,000	4,000	4,000	3,000	3,000
Total		24,000	22,000	24,000	21,000 r/	30,000
Manganese:						
Ore, gross weight e/	thousand tons	150	100	100	60	35
Concentrate: 5/						
Gross weight	do.	104	68	73 e/	42 e/	20 e/
Mn content	do.	26	17	19	11	5
Silver, mine output, Ag content e/		20 r/	20 r/	20 r/	18 r/ 3/	20
Zinc:						
Mine output, Zn content of concentrate		32,082	31,737	25,650 r/	26,536 r/	27,455
Metal, primary and secondary:						
Smelter		28,162	30,226	29,427	25,000	25,000 e/
Refined		80,000 e/	82,000	86,000	84,000	84,000 e/
Industrial minerals:						
Barite, processed		12,541	12,729	10,327	4,632 r/	4,266
Cement, hydraulic	thousand tons	6,956	6,553 r/	7,300	6,252	8,264
Clays:						
Bentonite:						
Run of mine e/		100,000	60,000	60,000	45,000	80,000
Marketable		43,543	27,133	25,434	20,577 r/	35,789
Kaolin:						
Run of mine e/		145,000	90,000	75,000	75,000 r/	65,000
Marketable		45,200	29,169	24,742	25,456 r/	19,007
Diatomite		56,906	23,880	34,600	11,592	9,712
Feldspar		34,975	25,962	37,010	36,627 r/	38,361
Fluorspar e/		15,000	15,000	15,000	15,000	15,000
Graphite		2,931	2,563	1,951	1,041	1,251
Gypsum	thousand tons	91	79	297	308 r/	229
Lime	do.	1,748	1,599	1,813	1,623 r/	1,480
Nitrogen, N content of ammonia	do.	1,513	781	378	686	700 e/
Pyrites, gross weight	do.	168	208	200	195 r/	35
Salt:						
Rock salt	do.	808	254	68	64 r/	52
Other	do.	1,881	2,369	2,220	2,133 r/	2,215
Total	do.	2,689	2,623	2,288	2,197 r/	2,267
Sand and gravel	do.	907	711	1,049	763 r/	653
Sodium compounds, n.e.s.:						
Caustic soda	do.	326	322	310	297 r/	355
Soda ash, manufactured, 100% Na_2CO_2 basis	do.	537	548	482	414 r/	405

See footnotes at end of table.

TABLE 1--Continued
BULGARIA AND ROMANIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000
ROMANIA--Continued 4/						
Industrial minerals--Continued:						
Sulfur:						
S content of pyrites	thousand tons	42	52	50	48 r/	9
Byproduct, all sources	do.	68	43	46	45	45
Total	do.	110	95	96	93 r/	54
Sulfuric acid	do.	422	330	229	234	166
Talc		10,248	7,578	8,134	8,289	7,850
Mineral fuels and related materials:						
Carbon black		26,023	21,400	18,450	12,488 r/	14,756
Coal, washed:						
Anthracite and bituminous:						
For coke and semicoke production	thousand tons	312	324	192	110	13
For other uses	do.	10	10	2	1	1
Brown	do.	1,000	692	--	--	--
Lignite	do.	40,546	32,281	26,037	22,881 r/	29,279
Total	do.	41,868	33,307	26,231	22,992 r/	29,293
Coke:						
Metallurgical	do.	2,948	3,110	2,929	1,593	1,536
Other	do.	1	1	--	--	--
Total	do.	2,949	3,111	2,929	1,593	1,536
Gas, natural, gross:						
Associated	million cubic meters	1,361	1,245	1,210	1,164	1,164
Nonassociated	do.	16,801	14,671	13,231	13,413	13,413
Total	do.	18,162	15,916	14,441	14,577	14,577
Petroleum:						
Crude:						
As reported	thousand tons	6,626	6,515	6,309	6,154	6,038
Converted	thousand 42-gallon barrels	49,400	48,760	47,020	45,866	45,000
Refinery products e/	do.	132,000	125,000	95,000	77,265 3/	78,000

e/ Estimated; estimated data are rounded to no more than three significant digits and may not add to totals shown. r/ Revised. -- Zero.

1/ Table includes data available through October 2001.

2/ In addition to commodities listed, chromite, magnesite, palladium, platinum, tellurium, and uranium and a variety of crude construction materials (common clays, dimension stone, and crushed stone) are produced, but available information is inadequate to make reliable estimates of output level.

3/ Reported figure.

4/ In addition to the commodities listed, antimony, asbestos, and a variety of crude construction materials are produced, and molybdenum may have been produced as a byproduct of copper from 1988 on; output is not reported quantitatively and available information is inadequate to make reliable estimates of output levels.

5/ Estimated series were based on published data on concentrate production.

TABLE 2
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Cement	Reka Devnia	Devnia	1,825.
Do.	Zlatna Panega	Panega	1,300.
Do.	Others	Temelkovo, Dimitrovgrad, Pleven, and Beli Izvor	1,590.
Coal:			
Bitiminous	Economic Mining and Power Combine (Smek) Balkanbass	Balkan Coal Basin in central Bulgaria, northwest of Silven	445.
Brown	G. Dimitrov	Pernik coal basin, southwest of Sofia	4,000.
Do.	Others	Bobov Dol and Pirin in western Bulgaria	3,100.
Lignite	SMEK East Maritsa	East Maritsa coal basin near Zagora	25,000.
Do.	Others	Marbas. Pernik, and Bobov Dol coal basins	5,300.
Copper (Cu):			
Concentrate, Cu content	Asarel-Medet AD	Panagurishte, Pazardzhik District	25.
Do.	Chelopech Ltd.	Srednogorie, Sofia District	5.
Do.	Bradtze	Malko Turnovo	2.

See footnotes at end of table.

TABLE 2--Continued
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Copper (Cu)--Continued:			
Concentrate, Cu content--Continued	Elatzite-Med Ltd.	Srednogorie, Sofia District	15.
Do.	Rosen	Burgas, near the Black Sea	1.
Do.	Tsar Asen	Srednogorie, Sofia District	2.
Do.	Burgaskii Mines Ltd., Zidorovo	Burgas, near the Black Sea	0.5
Metal, refined	Union Miniere Pirdop Copper Smelter & Refinery	Srednogorie, Sofia District	120.
Iron ore	Kremikovtsi Iron and Steel Combine	Kremikovtsi	2,000.
Lead-zinc (Pb-Zn):			
Concentrate, Pb-Zn content	Gorubso Co.	Erma Reka, Kurdjali, Laki, and Rudozem, all in Madan area near Greek border	59 Pb, 47 Zn.
Do.	Madzharovo Ltd.	Near Plovdiv	3 Pb, 2 Zn.
Do.	Ossogovo Ltd.	Ossogovo Mountains, western Bulgaria	3 Pb, 2 Zn.
Do.	Ustrem Ltd.	Near Thundza River, eastern Bulgaria	3.5 Pb, 0.8 Zn.
Metal:			
Pb, refined	KCM SA, formerly Dimitur Blagoev	Plovdiv	44.
Do.	Lead and Zinc Complex Ltd.	Kurdjali	60.
Zn, smelter	KCM SA, formerly Dimitur Blagoev	Plovdiv	60.
Do.	Lead and Zinc Complex, Ltd.	Kurdjali	30.
Manganese ore	Mangan Ltd. (Obrotchishte)	Varna District	50.
Natural gas	Ministry of Power Supply	Chiren field, in northwest Bulgaria	(1/).
Petroleum:			
Crude	do.	do.	(1/).
Refined barrels per day	Economic Trust for Petroleum Products	Refineries in Burgas, Pleven, and Ruse	260,000.
Steel, crude:	Kremikovtsi Iron and Steel Works	Near Sofia	2,300.
Do.	Stomana Iron and Steel Works	Pernik	1,300.

1/ Insignificant capacity.

TABLE 3
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies (Government-owned unless otherwise specified)	Location of main facilities	Annual capacity
Alumina	Soc Com Alor SA [Balli Group (United Kingdom), and Bayrakter Co. (Turkey) own 51%)	Plant at Oradea, near Hungarian border	250.
Do.	do.	Plant at Tulcea, Danube Delta	400.
Aluminum, primary	Alro SA (Slatina Aluminium Enterprise)	120 kilometers west of Bucharest	270.
Barite	Ministry of Industry	Ortra mine, Rosia Montana, southwest of Cluj	100.
Bauxite	do.	Oradea-Dobresti Mining Complex, near Hungarian border	250.
Cement	Cimentul SA Turda	Plant at Turda, 600 kilometers from port of Constanta	Cement, 1,360; clinker, 850.
Do.	Cimentul SA Cimus	Plant at Cimpulung, about 499 kilometers from port of Constanta	Cement, 2,200; clinker, 1,360.
Do.	Moldocim SA Bicaz	Plant at Bicaz, about 450 kilometers from port of Constanta	Cement, 3,100; clinker, 1,520.
Do.	Romcif SA Fieni	Plant at Fieni, about 420 kilometers from port of Constanta	Cement, 1,600; clinker, 960.
Do.	Romcim SA	Plant at Alesd, 812 kilometers from port of Constanta	Cement, 3,500; clinker, 2,120.

TABLE 3--Continued
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies (Government-owned unless otherwise specified)	Location of main facilities	Annual capacity
Cement--Continued:	Romcim SA	Plant at Hoghiz, 437 kilometers from port of Constanta	Cement, 2,200; clinker, 1,520.
Do.	do.	Medgidia plant, about 35 kilometers west of Constanta	Cement, 3,500; clinker, 1,980.
Do.	do.	Plant at Jiu, about 533 kilometers from the port of Constanta	Cement, 3,000; clinker, 2,045.
Coal:			
Bituminous	Compania Nationala a Huilei-Petrosani	Valea Jiului Mining Complex, near Hunedoara	10,400.
Lignite	Societatea National a Lignitului Oltenia-Targu Jui	Jiu Valley, Oltenia County, north of Craiova	20,300.
Do.	Societatea National a Carbunelui-Ploiesti	About 50 kilometers north of Bucharest	8,700.
Copper:			
Ore (concentrate)	Compania Nationala REMIN S.A. and Compania Nationala Minvest	Baia Mare, Baia-Sprie, and Cavnic mines, northwestern area near the Ukrainian border; Rosia Montana, Noud, Borsa Balan, and Lesul-Ursului Mines--in east-west arc along Carpathian range; Rosia Poieni Mine; and Moldova Noua Mine, southwest near Danubian border with Yugoslavia	180.
Metal	Compania Nationala REMIN S.A.	Outokumpu flash smelter and electrolytic refinery at Baia Mare in the northwestern area, near the Ukrainian border	35.
Do.	do.	Zlatna smelter and refinery, Apuseni, northwest Romania	13.
Ferroalloys	Ferom-Joint Stock Co.	Complex at Tulcea	280.
Iron ore	Compania Nationala Minvest	Mining complex at Hunedoara, in west-central Romania	1,320.
Do.	do.	Resita Mining Complex, southwestern Romania, near Yugoslav border	660.
Do.	do.	Napoca-Cluj Mining Complex, northwestern Romania on the Somesul River	990.
Lead in ore	Compania Nationala REMIN S.A.	Baia Mare Mine, near Ukrainian and Hungarian borders	24.
Do.	Compania Nationala Minvest	Balan Mine, 50 kilometers southwest of Piatra Neamt	10.
Lead metal	Sometra S.A.	Imperial Smelter at Copsa Mica, central Romania, on the Tirnava Mare River	42.
Natural gas million cubic feet per year	Ministry of Industry, Department of Energy	Tirgu Mures Field at Tirgu Mures, north-central Romania	996,000
Do. do.	do.	Ploesti Field, 50 kilometers north of Bucharest	249,000
Petroleum, crude barrels per day	do.	Ploesti-Teleajen, Pitesti, and Tirgoviste Fields, in Prahova Valley around Bucharest; Bacau Field at Bacau, east-central Romania near the Siretul River; and West Carpathian Field, southeastern Carpathian Mountains, between the west bank of the Olt River and Tirgu Jiu	250,000.
Petroleum, refined do.	do.	Refineries at Brazil, Pitesti, Onesti, Barcau, Borzesti, Brasov, Cimpina, Darmanesti, Oradea, Ploesti, Teleajen, and Navodari	664,000.
Steel	Gavazzi Steel SA (formerly Otel Rosu)	Caras-Severin, southeastern region, near Yugoslav border	400.
Do.	SC Industrie Sarmei SA	Campia Turzii, Cluj, northwestern Romania	300.
Do.	Sidex SA Galati	Danube River, north of Brail, near the Ukrainian border	10,000.
Do.	Siderurgica SA Hunedoara	West-central Romania, near Calan	2,135.
Do.	CSR SA Resita	Southwestern Romania, about 20 kilometers southwest of Caransebes	1,200.
Do.	Siderica SA Calarasi	Near the Bulgarian border close to the Danube	2,200.
Do.	COST SA Targoviste	Targoviste, Dimbovita, near Bucharest	1,100.
Zinc in ore	Compania Nationala Minvest	Baia Mare, near Ukrainian and Hungarian borders	60.
Zinc metal	Sometra S.A.	Imperial Smelter at Copsa Mica, Tirnava River, central Romania	66.

THE MINERAL INDUSTRIES OF THE

COMMONWEALTH OF INDEPENDENT STATES—ARMENIA, AZERBAIJAN, BELARUS, GEORGIA, KAZAKHSTAN, KYRGYZSTAN, MOLDOVA, RUSSIA, TAJIKISTAN, TURKMENISTAN, UKRAINE, AND UZBEKISTAN

By Richard M. Levine and Glenn J. Wallace

The Commonwealth of Independent States (CIS) was created in December 1991 by republics of the former Soviet Union FSU). In the adopted declaration, the participants of the Commonwealth declared that their interaction would be based on the principles that all member states have sovereign equality and are independent and equal subjects under international law. The CIS is not a state and it does not have supranational powers Executive Committee of the Commonwealth of Independent States, 2001, Commonwealth of Independent States, accessed June 25, 2001, at URL http://www.cis.minsk.by/english/engl_cis.html). In 2000, the members of the CIS were Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

In September 1993, the CIS states signed an agreement on the creation of an economic union "to form common economic space grounded on free movement of goods, services, labor force, capital; to elaborate coordinated monetary, tax, price, customs, external economic policy; to bring together methods of regulating economic activity and create favorable conditions for the development of direct production relations" (Interstate Statistical Committee of the Commonwealth of Independent States, [undated], About Commonwealth of Independent States, accessed June 25, 2000, at URL http://www.cisstat.com/eng/cis.htm).

In 2000, all the countries of the CIS reported an increase (in constant prices) in their gross domestic products (GDP) and in industrial output in comparison with those of 1999, with the exception of Turkmenistan for which there was no reporting (table 3).

ARMENIA, AZERBAIJAN, GEORGIA, AND TURKMENISTAN (CAUCASUS AND CASPIAN SEA LITTORAL COUNTRIES)

The countries of this region were producers of a number of metallic and industrial minerals. Armenia had been mining one-third of the FSU's output of molybdenum. It also mined copper, copper-zinc, and native gold deposits. Significant byproduct constituents in the country's nonferrous ores include barite, gold, lead, rhenium, selenium, silver, tellurium, and zinc.

Armenia had a large industrial minerals industry and was the largest producer of perlite in the FSU. It produced a number of other industrial minerals, including clays, diatomite, dimension stone, limestone, salt, and semiprecious stones, and had a diamond-cutting industry. Armenia, however, had practically no mineral fuel production.

Azerbaijan's most significant reserves in terms of value were its oil reserves located offshore in the Caspian Sea. A large number of major foreign firms were involved in projects to develop these reserves. Azerbaijan was also a producer of alunite, alumina, aluminum, copper-molybdenum ore, iron ore, and lead-zinc ore. The country produced many industrial minerals, the most important being bromine, clays, gypsum, iodine, limestone, marble, sand and gravel, decorative building stone, and precious and semiprecious stones.

Georgia had been a major producer of manganese from the Chiatura deposit during the Soviet period, but production subsequently had fallen precipitously. The manganese was used domestically for ferroalloy production at the Zestafoni ferroalloys plant. A small amount of iron ore also was mined, and the Madneuli complex, a copper-barite polymetallic deposit, was exploited for barite, copper, and a range of byproduct minerals that included gold and silver. Lead and zinc were mined at the Kvaisi lead-zinc deposit, and arsenic was mined from the Lukhumi and the Tsansa deposits. The steel mill in Rustavi had the capacity to produce 1.4 million metric tons per year (Mt/yr) of crude steel as well as the capacity to produce coke, pig iron, sinter, rolled products, and tubes and pipes (Metal Bulletin Books Ltd., 1997, p. 131).

Georgia produced a range of industrial minerals that included bentonite, diatomite, talc, and zeolites and also mined semiprecious stones. Decorative stones for use as building materials were mined at more than 100 deposits (Georgian Investment Center, 1998, Overview of the economic sectors of Georgia—Mining, accessed July 2, 1998, at URL http://www.georgia.net.ge/gic/Sector/Mining.HTM). Many clay deposits as well as high-quality quartz sand and sand and gravel deposits also were developed for the production of bricks and ceramic products. The country produced some coal and crude oil and had an oil refinery at Batumi. Extraction of natural gas ceased in 1997.

Turkmenistan was a leading producer of natural gas, and more than 90% of foreign direct investment went into the country's oil and natural gas sectors. Investment, however, has slowed in the past few years owing to the restrictive conditions that Turkmenistan has attached to foreign investment. Turkmenistan, however, was moving to attract additional foreign investment in order to develop its vast oil and gas resources (U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed October 25, 2001, at URL http://www.eia.doe/gov/emu/cabs/turkmen.html).

Turkmenistan has a wide variety of industrial mineral resources, which include bromine, iodine, salt, sodium sulfate, and sulfur. The Garabogaz Aylagy lagoon off the Caspian Sea was one of the world's largest sources of raw materials for the chemical industry; commercial interest in the salts of this region began at the end of the 19th century (Weisman and McIlveen, 1983, p. 1214-1215). Production from the Garabogaz Aylagy had accounted for almost 45% of the FSU's sodium sulfate production and all of its production of epsomite and medicinal Glauber's salt (Aganbegyan and Ovezgel'byev, 1998, p. 97).

The countries of the Caspian Sea region were of greatest importance to world energy markets owing to the large oil and gas reserves in this region that were beginning to be fully developed. These resources have created competition between countries concerning their ownership, among companies to get development rights, and among countries to establish export routes. The area of the Caspian Sea, which was bordered by four CIS states (Azerbaijan, Kazakhstan, Turkmenistan, and Russia) and Iran, was developing into a significant oil- and gas-exporting area. The Caucasus countries of the CIS (Armenia, Azerbaijan, and Georgia) were potentially major world oil transport centers. Proven oil reserves for the entire Caspian Sea region [estimated to be between 18 billion barrels (Gbbl) and 35 Gbbl] were comparable with those of the United States (22 Gbbl) and greater than those in the North Sea (17 Gbbl)]; undiscovered oil resources could yield another 235 Gbbl of oil. The majority of Azerbaijan's oil resources are offshore, and apparently 30% to 40% of Kazakhstan's and Turkmenistan's total oil resources also are offshore (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Natural gas reserves in the Caspian region exceeded oil reserves in comparable magnitude. Natural gas reserves accounted for almost two-thirds of the hydrocarbon resources in the Caspian Sea region. Proven gas reserves in the Caspian region are estimated to be between 243 trillion cubic feet (6.88 trillion cubic meters) and 248 trillion cubic feet (7.02 trillion cubic meters), which would be somewhat less than North American reserves of 300 trillion cubic feet (8.50 trillion cubic meters) (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

For the Caspian Sea region to be developed to its full oil and gas potential, the littoral states must first agree on the legal status of the sea in order to settle the issue of the ownership of resources. Following the collapse of the Soviet Union and the establishment of Azerbaijan, Kazakhstan, Russia, and Turkmenistan as independent states, the question of ownership and development rights in the sea has remained unresolved. Nc agreed-upon convention exits that delineates the littoral states' ownership of the sea's resources or their development rights. Several conflicts have arisen over claims to regions of the sea. Disputes exist concerning whether the resources in the Caspian should be shared in common by all littoral states or if the Caspian Sea should be divided into national sectors. Negotiations between the littoral states have made slow progress resolving differences. Azerbaijan, Kazakhstan, and Russia had agreed on dividing the sea by a "modified median" principle, Iran had insisted on an equal division of the sea, and Turkmenistan's position was evolving.

Division into national sectors has been the de facto solution. However, disputes have arisen over the delineation of these national sectors. For example, Turkmenistan and Azerbaijan are disputing ownership of a field called Serdar by Turkmenistan and Kyapaz by Azerbaijan. Azerbaijan protestec Iran's decision to award Royal Dutch/Shell Group and Lasmo Oil Ltd. a license to conduct seismic surveys in a region that Azerbaijan considers part of its territory. Turkmenistan claims that portions of the Azeri and Chirag fields, which Azerbaijan calls Khazar and Osman, respectively, lie within its territorial waters rather than Azerbaijan's. Turkmenistan, furthermore, has insisted that development of the Azeri and Chirag fields, which is being carried out by Azerbaijan International Operating Co. (AIOC), be stopped.

Nevertheless, countries are engaged in active exploration anc development programs in what they considered to be their sectors of the Caspian Sea. Azerbaijan and Kazakhstan, in particular, in conjunction with foreign firms, have made progress in offshore oil development.

Another major area of controversy that has significant economic, environmental, and geopolitical ramifications involves the proposed routing of pipelines to export hydrocarbons from this region. The issues involved the degree that Russia should control export routes by having them pass through its territory, the intent of countries to avoid routing pipelines through such potentially unfriendly countries as Iran and Afghanistan, the role of Armenia as a potential transit rout owing to its conflict with Azerbaijan, and the potential environmental hazards of routing shipments by pipeline under the Caspian Sea or by tanker through the Bosporus. Such unresolved issues have obstructed the planning and constructio of potential export pipelines from the region.

The so-called northern route, which was being used to transport the first oil production (early oil) from Azerbaijan, transits 80 miles [47 kilometers (km)] (through the war-torn Russian republic of Chechnya en route to the Black Sea port o Novorosiisk). Russia had announced that it would build anoth pipeline that would bypass Chechnya.

A western route was also in use for early oil that passed through Georgia to the Black Sea. A major western route bein proposed was the Baku-Ceyhan Pipeline route termed the mair export pipeline (MEP), which would extend 1,038 miles (1,74 km) through Azerbaijan, Georgia, and Turkey and transport oi from the Caspian littoral states to Ceyhan in Turkey on the Mediterranean Sea. The pipeline could also be used to export oil from Kazakhstan's major (though not yet developed)

Kashagan field in the Caspian Sea. The three countries on whose territory the pipeline would be built have affirmed their support for the project, but the oil companies that would finance the construction of the pipeline would have to agree on the economic feasibility of this project. The planned commissioning of the pipeline would be in 2004, and it would have the capacity to transport 1 million barrels per day (Mbbl/d) of crude oil (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

BELARUS AND MOLDOVA (WESTERN STATES)

Belarus and Moldova each had one of the two steel minimills built in the FSU. In 2000, the volume of ferrous metals production exceeded the 1991 levels for these countries. Neither country possessed significant mineral resources except for potash in Belarus. Belarus also had a large oil refining industry that was mainly controlled by Russian companies.

KAZAKHSTAN

Kazakhstan is the second largest country in land area after Russia to form from the republics of the FSU. It is endowed with large reserves of a wide range of minerals. Kazakhstan was a major producer of a large number of metals that included beryllium, bismuth, cadmium, chromium, copper, ferroalloys, lead, magnesium, rhenium, titanium, uranium, and zinc. It produced significant amounts of a number of other mineral products that included arsenic, barite, coal, gold, molybdenum, natural gas, oil, phosphate rock, and tungsten. Kazakhstan has commercial reserves of 3 ferrous metals, 29 nonferrous metals, 2 precious metals, 84 types of industrial minerals, and coal, natural gas, and petroleum (Zharkenov, 1997).

A large percentage of mining and metallurgical enterprises were under the control of foreign managers who, in exchange for a share of the profits as well as potential ownership rights to stock, were investing in modernizing the enterprises, increasing output and exports, decreasing costs, and upgrading technology to meet environmental standards (Zharkenov, 1997).

In November, the Government of Kazakhstan announced that it intended to sell part of its remaining shares in a number of mining and metallurgical companies, such as Aluminum of Kazakhstan OJSC, Kazkhrom Corp., Kaztsink JSC, the Sokolov-Sarbai iron ore mining enterprise, and the Ust'-Kamenogorsk titanium-magnesium plants (Mining Journal, 2001). A major portion of most of these enterprises was already controlled by foreign investors.

Kazakhstan has significant oil and gas reserves. The oil and gas industry, which was one of Kazakhstan's most attractive areas for foreign investment, was export-oriented. Coal was Kazakhstan's major source of domestic fuel. As much as 80% of the energy sector's fuel demand was met by coal. The country produced sufficient amounts of coal for domestic use and for exports to other CIS countries. There was a trend in the development of Kazakhstan's coal industry, whereby some coal mines and electric powerplants had been purchased by industrial enterprises interested in obtaining an uninterrupted supply of energy (Kazkommerts Securities, January 1998, Kazakhstan economic research, accessed May 15, 1999, at URL http://www.kazecon.kz/Kazkom/NewGuide/engl/page_4.htm).

Kazakhstan's wealth of mineral resources had spurred rapid development of the mining and mineral-processing industries. Furthermore, the country's territory was the site of military bases, the Baykonur cosmodrome, and weapons testing grounds, including nuclear weapons. All these resulted in extensive air, water, and soil pollution and natural resource depletion. Changes in the environment caused a sharp rise in population morbidity and mortality rates, serious destruction of ecosystems, desertification, and significant loss of biodiversity (Ministry of Environment and Natural Resources of the Republic of Kazakhstan, [undated], National environmental action plan for sustainable development of the Republic of Kazakhstan, accessed May 4, 1999, via URL http://www.zoo.co.uk/ ~z80000142/links.html). Radioactive fallout from weapons testing had spread over a territory of 304,000 square kilometers inhabited by about 1.5 million people.

Kazakhstan mined a significant percentage of uranium production in the CIS. Extracting and processing uranium ores was accompanied by the generation of radioactive waste. As a result, the situation regarding the use and burial of radioactive waste remained a pressing issue.

Owing to high international oil prices and the rebound of the Russian economy in 2000, Kazakhstan's fiscal situation improved. Significant production increases were reported in the production of practically all ferrous and nonferrous metals, coal, crude oil, and natural gas. In 2000, Kazakhstan increased practically all its mineral product exports in quantity and value compared with exports of 1999 (table 4). A large percentage of Kazakhstan's reported exports of copper, ferrous metals, ferroalloys, lead, crude oil, oil products, precious metals, and zinc went to countries outside of the CIS (table 4). The country's finances were, to a large degree, dependent on revenues from the oil and gas sector, with the price of oil being the most important factor in the mineral sector determining Kazakhstan's fiscal situation.

Kazakhstan's largest source of export earnings from countries outside the CIS after oil and oil products was steel products, including ferroalloys, followed by copper, precious metals, zinc, cotton fiber, alumina, and lead (Interfax Statistical Report, 2001d). Kazakhstan also exported substantial quantities of alumina, coal, iron ore, and lead to CIS countries and imported some coke, natural gas, and steel products from CIS countries (Interfax Statistical Report, 2001b, c).

In 1999, the mining sector produced 36% of total industrial output and 9% of the GDP. In 2000, revenues from the oil sector were estimated to compose 6.1% of the GDP (Interfax Statistical Report, 2001d). In 1999, the mining sector employed 126,000 workers, which was about 5% of the total workforce (International Monetary Fund, 2001, p. 40-41).

KYRGYZSTAN, TAJIKISTAN, AND UZBEKISTAN (OTHER CENTRAL ASIAN COUNTRIES)

Those Central Asian countries that do not border the Caspian Sea had been primarily significant to world mineral markets as gold producers, along with the production of some other mineral products (uranium in Uzbekistan, antimony in Kyrgyzstan, and aluminum in Tajikistan).

Kyrgyzstan's mineral industry was involved in both mining and processing mineral products, mining primarily antimony, coal, gold, mercury, molybdenum, tin, and tungsten. Its metallurgical industry led the FSU in the production of two nonferrous metals, mercury and antimony, and processed rare-earth metals and uranium. Several major gold deposits are now under development. Although Kyrgyzstan produced coal and some gas and oil, it was still significantly dependent on imported energy. In recent years, Kyrgyzstan's economy has benefited greatly from gold production from the Kumtor Gold Co. joint venture with Cameco Gold Inc. of Canada.

Tajikistan mined a number of metals, including antimony, bismuth, copper, gold, lead, mercury, molybdenum, silver, tungsten, and zinc; a variety of industrial minerals; and mineral fuels, including coal, natural gas, and petroleum. The Tajik aluminum plant (Tadaz) in Tursunzade in the southwestern part of the country had a capacity to produce about 520,000 metric tons per year (t/yr) of primary aluminum; it was one the largest primary aluminum plants in the FSU, although its entire alumina supply must be imported.

The country also mined a number of metals, including antimony, bismuth, copper, gold, lead, mercury, molybdenum, silver, tungsten, and zinc; a variety of industrial minerals; and mineral fuels, including coal, natural gas, and petroleum. Tajikistan has more than 400 mineral deposits that have been explored containing 70 types of minerals. Its reserves of natural gas were reportedly 200 billion cubic feet (5.66 billion cubic meters) and its oil reserves 430 million metric tons (Mt) (Foreign Broadcast Information Service, April 5, 1998, Tajik geologists are celebrating their professional holiday—Dushanbe Radio Tajikistan transcription, accessed June 4, 2000, via URL http://fbis.fedworld.gov).

Tadaz was a major consumer of the country's electric power production, consuming about 40% of total production. After Russia, Tajikistan had the second largest hydroelectric power resources among the countries of the FSU. Hydroelectric power accounted for about 75% of total energy produced by the country and was also exported to neighboring countries (U.S. Department of Commerce, 1998).

Tajikistan reportedly possesses the largest antimony deposits in the FSU. Antimony and mercury concentrates were produced at the Anzob mining and beneficiation complex that mined the Dzhizhikrutskoye antimony and mercury deposit. The antimony concentrates were exported for further processing to the Kadamzhay antimony plant in Kyrgyzstan, the FSU's major producer of antimony metal and compounds.

Tajikistan was dependent on imported fuel. It was trying to attract investment to develop its coal resources. The country required about 2 Mt/yr of coal, and produced less than 20,000 t/yr (Interfax Mining and Metals Report, 1999b). Gold production was another important part of Tajikistan's economy, and the country had created a number of joint ventures with foreign firms to develop its gold resources. Tajikistan also has large silver resources, but there had been no large-scale development of these resources.

Uzbekistan, along with gold, produced steel and a number of nonferrous metals that include copper, lead, molybdenum, silver, tungsten, and zinc. Uzbekistan's major nonferrous-metals-producing enterprise was the Almalyk mining and metallurgical complex. Uzbekistan also produced industrial minerals, including feldspar and fluorspar, and mineral fuels, including coal, natural gas, and uranium. The country ranked among the 15 leading countries of the world in terms of size of gas reserves and was the world's eighth largest natural gas producer. Since achieving independence, Uzbekistan had increased crude oil production to the level where it was self-sufficient. Most of the country's natural gas output required processing because of its high sulfur content, and the country had one of the FSU's largest gas-processing facilities at Muborak (formerly Mubarek). Lack of adequate pipeline routes had hindered Uzbekistan exporting gas and oil to world markets. Uzbekistan also had large uranium reserves and was a large uranium producer and exporter. The country ranked seventh in the world in uranium reserves and was the world's fifth largest uranium producer in 1998 (U.S. Energy Information Administration, March 2000, Country analysis briefs—Uzbekistan, accessed December 12, 2000, at URL http://www.eia.doe.gov/emeu/cabs/uzbek.html).

Given Uzbekistan's large gold production as well as its self-sufficiency in mineral fuels, the mineral sector would remain one of the chief contributors to the country's economic development (U.S. Energy Information Administration, March 2001, Country analysis briefs—Uzbekistan, accessed September 24, 2001, at URL http://www.eia.doe.gov/emeu/cabs/uzbek.html).

RUSSIA

Russia, which extends over 11 time zones, is the largest country in land area in the world and occupies more than 75% of the territory of the FSU. Accordingly, it possesses a significant percentage of the world's mineral resources. Russia is a major mineral producer, accounting for a large percentage of the CIS's production of a range of mineral products that include aluminum, bauxite, coal, cobalt, diamonds, mica, natural gas, nickel, oil, platinum-group metals, tin, and many other metals, industrial minerals, and mineral fuels.

Russia accounted for about 14% of the world's total mineral extraction (Razovskiy, 2001). The mineral industry was of great importance to the Russian economy. Enterprises considered to be part of the mineral and raw-material complex contributed more than 70% of budget revenues derived from exports (Malyshev, 2000). The most significant regions of the country for metal mining were East Siberia [cobalt, columbium (niobium), copper, lead, nickel, platinum-group metals, tungsten, and zinc], the Kola Peninsula [cobalt, columbium (niobium), copper, nickel, rare-earth metals, and tantalum], North Caucasus (copper, lead, molybdenum, tungsten, and zinc), the Russian Far East (gold, lead, silver, tin, tungsten, and zinc), and the Urals (bauxite, cobalt, copper, lead, nickel, and zinc) (Novikov and Yastrzhembskiy, 1999).

Most Russian crude oil and natural gas production came from large deposits in West Siberia. Coal production was mainly from East Siberia and West Siberia. Raw materials mined for mineral fertilizers were produced primarily on the Kola Peninsula (phosphate raw material) and in the Urals (potash).

According to assessments of the Russian Ministry of the Economy's Department of the Economics of Metallurgy, reserves are sufficient at the 1995 to 2000 levels of extraction to supply existing enterprises mining iron ore for at least 15 to 20 years and enterprises mining nonferrous metals for 10 to 30 years (Yatskevich, 2000). A large percentage of Russia's reserves, however, is in remote northern and eastern regions of the country that have severe climates, lack transport, and are far from major population and industrial centers.

Enterprises built during the Soviet era in such areas, including those mining tin and tungsten, had curtailed operations sharply. Efforts to develop new large deposits of nonferrous metals in eastern regions near the Baikal-Amur railroad were not progressing. Metallurgical enterprises in developed regions, such as the Kola Peninsula, North Caucasus, and the Urals, were operating on rapidly depleting resource bases and were experiencing raw material shortages (Yatskevich, 2000).

More than 50% of Russia's mineral resources is east of the Urals where there is a large number of small deposits of various types of minerals. In order to develop resources in the eastern part of the country, a Russian researcher proposed encouraging the creation of small mining enterprises to develop rich small deposits. He stated that this would lessen the need for large-scale investment, provide a quicker return on capital, and deal more effectively with environmental concerns. He believed that these enterprises should be constructed in such a way that they could be dismantled and relocated within a 5-year period (Dobrynin, 2001a).

In 2000, economic stability increased owing to a substantial increase in government revenues and a shift in economic policy with the elaboration of the Government's economic program. The increase in revenues resulted from an increase in foreign exchange revenues from oil and gas sales; some increase in tax collections, particularly in the natural resource sector; and a rebound in production. The Government's economic program was geared to improving the environment for development of the private sector, strengthening the social safety net, and restructuring the executive, legislative, and judicial branches of government on a national and regional level. The program was attempting to implement structural reforms that would lead to sustainable economic growth and, over a longer term, a reduction in poverty. The Russian economy still remained vulnerable to fluctuations in international oil prices and needed to reduce the level of capital flight. Additionally, Russia's deteriorating infrastructure could be an impediment to growth unless adequate investment is made.

In 2000, Russia reported increased production for nonferrous and precious metals with the exception of tungsten metal and lead metal, including secondary lead (Interfax Mining and Metals Report, 2001an). Production increases were reported for all ferrous metals and ferroalloys. In the fuel sector, production increases were reported for coal and crude oil, but production decreased for natural gas. Despite decreased metal output compared with the Soviet period, Russia was producing more aluminum, lead, and zinc in 2000 than during the Soviet era. On the other hand, it was producing only about 20% as much tin as it was then (Kozyrev and Karmanov, 2001).

The nonferrous mining and metallurgy sector, despite its economic importance and production potential in terms of facilities and resources, was experiencing a number of problems. Only about 10% of the technology employed in this sector was rated as world class (Yelyutin and others, 2001). Equipment at enterprises was wearing out, and products from many enterprises were not competitive on world markets. Much of the technology employed was not state-of-the-art in terms of pollution abatement. Labor productivity in this sector was almost one-third below that of advanced industrialized countries, and energy expenditures per unit of output were between 20% and 30% higher (Yelyutin and others, 2001).

The nonferrous metallurgy sector produced mainly primary metals for export, especially aluminum, copper, and nickel. The majority of enterprises in this sector operated at a loss. A major problem was that the resource base for enterprises in this sector was not competitive in terms of quality with that of producers in other countries. Only the resource base for antimony, copper, nickel, and in part, molybdenum was considered to be of competitive quality with other world producers (Sysoyev, 2000).

A major problem confronting the metallurgical industry was the sharp increase in scrap exports that had occurred since 1995. During the period from 1995 to 1998, exports of steel scrap increased to 356,500 t/yr from 28,600 t/yr and of aluminum scrap to 367,300 t/yr from 11,900 t/yr. Large numbers of entrepreneurs began exporting scrap, with numerous thefts of equipment to sell as scrap taking place. Besides the economic and safety problems that arose from dismantling of equipment and infrastructure for scrap, problems also arose from scrap being exported that had radioactive and other chemical contaminates. The Russian Government has been engaged in passing laws and enacting regulations to try to control the export of scrap, but these measures had still not resolved many of the problems in 2000 (Maslyukov, 2001).

In the industrial minerals sector, Russia was confronted with the problem that more than one-half its output was exported, depriving the domestic sector of needed products. The fertility of the soil was declining owing to a decrease in mineral fertilizer consumption, which was only 11 kilograms per hectare (kg/ha) versus the required 80 to 100 kg/ha. The sector also had to deal with very high transport costs. For a number of such industrial minerals as barite, bentonite, crystalline graphite, and kaolin, Russia was between 60% and 90% import-dependent. Much of these imports come from other CIS countries (Aksenov and others, 2000).

Russia had not been successful in attracting foreign investment for developing its mineral deposits for a number of reasons, including high taxes, which were often assessed in unexpected ways; the inability of investors to rely on the legal system; insecurity regarding licensing; a double standard often employed regarding domestic and foreign partners; the weakness of the banking system; and the inability to directly export some commodities (Dobrynin, 2001b).

UKRAINE

Ukraine is the largest CIS country in land area solely in Europe. At the end of the 1980s, Ukraine mined about 5% of the world's output of mineral products (Gurskiy and Kalinin, 2000). Since the breakup of the Soviet Union, production in Ukraine's mineral sector had fallen precipitously. Based on the former importance of Ukraine's mineral industry, its successful functioning was considered to be critical for the country's economic renewal.

In 2000, Ukraine continued to be a major world producer of coal, ferroalloys, ilmenite, iron ore, manganese ore, and steel. The country had been a lesser producer of a number of other metallic mineral products that included alumina, aluminum, cadmium, germanium, secondary lead, magnesium, mercury, nickel, rutile, uranium ore, secondary zinc, zircon, and zirconium and of a large number of industrial minerals that included dolomite, graphite, kaolin, limestone fluxes, potash, quartz, salt, soda ash, and a variety of building materials. Because of the large reduction in demand that followed the breakup of the Soviet Union, Ukraine sharply reduced or ceased producing a number of these commodities.

Ukraine's mining and metallurgical industry consisted of about 300 enterprises, including 17 iron and steel mills, 7 pipe plants, 10 metals goods plants, 16 coke-chemical plants, 17 refractory production plants, 26 mining enterprises, 3 ferroalloys plants, 20 nonferrous metals plants, 35 secondary metals plants, and 30 scientific research and design organizations. The industry employed about 500,000 persons, of which 270,000 were employed at ironmaking, steelmaking, and ferroalloys enterprises (Kharakhulakh, 2001).

On July 14, 1999, the Ukrainian Parliament adopted a law entitled "Conducting an Economic Experiment at the Enterprises of Mining and Metals Companies" that pertains to iron ore mining enterprises, beneficiation plants, foundries, steel mills, pipe plants, and coke enterprises. This law provided tax benefits for mining and metal industry firms for a period from July 1999 through January 2002. The law attempted to aid Ukrainian firms to increase their working capital to upgrade production facilities and to avoid barter transactions in purchasing such critical supplies as fuel and energy (U.S. Embassy, Kiev, October 5, 1999, Ukraine—Developments in the steel and mining sectors, accessed October 27, 2001, at URL http//www.bisni.doc.gov/bisnis/isa/9910mining_ua.htm).

The major source of waste in Ukraine is the mining industry. In 1997, the volume of accumulated mineral wastes in Ukraine exceeded 30 billion metric tons (Gt). This volume included more than 26 Gt of mining wastes, more than 20 Gt of which was waste from iron ore production. It was estimated that stockpiled iron ore wastes contained at least 200 Mt of iron, 2,000 metric tons (t) of silver, 10,000 t of vanadium, and 100,000 t of germanium as well as gold and other minerals. Owing to inefficiencies in production processes, the volume of accumulated waste was expected to continue its growth by a minimum of 2% per year (Friends of the Earth Scotland, October 1998, Sustainable use of resources in Europe newsletter, accessed October 27, 2001, at URL http://www.foei.org/campaigns/SSP/SSP_SURE2.htm).

Although Ukraine's GDP has fallen by more than 60% since the breakup of the Soviet Union, the official figures overstate the fall in output since estimates for production from the informal sector range as high as 60% of total GDP. The financial crisis in Russia in 1998 caused ripple effects throughout the region, including Ukraine. The country's GDP fell by 1.9% in 1998 and by 0.4% in 1999. In late 1999, the Government increased reform efforts and achieved some success. Ukraine's economy started to show signs of recovery in late 1999. In 2000, the GDP grew by 6% compared with that of 1999, with the highest growth rates achieved in import-substituting (textiles and food) and export-oriented industries (metallurgy and chemicals). In 2000, Ukraine achieved its first reported year of positive economic growth since independence.

Ukraine's Government understood the need for a program of broad, deep structural reforms in the economy. Progress on structural reforms was mixed. By 2000, small-scale enterprise privatization was virtually completed, but improvement was needed in privatizing very large enterprises. The transparency of the privatization process also needed to be improved. The Government had created an adequate legal and institutional structure for capital-markets operation and supervision with the creation of its Securities and Stock Market Commission. Banking sector reforms had also been undertaken. Since January 1, 1998, a new accounting system compatible with international standards and new regulations were introduced that strengthened banking supervision. Energy use remained excessively high, and reform of the energy sector was needed. This sector was not financially self-sustaining and had serious problems dealing with massive nonpayment problems and inadequate cost recovery (World Bank Group, September 2000, Country brief—Ukraine, accessed July 31, 2001, at URL http://www.wbln0018.woldbank.org/ECA).

In 2000, Ukraine exported $6 billion worth of metal products, which accounted for 63% of the country's export earnings. Of the total metals exports, $4.7 billion was ferrous metals, which accounted for 40% of the country's export earnings. Because of Ukraine's large metals exports, as of June, 13 countries were conducting more than 100 antidumping investigations against Ukraine for 26 groups of commodities (Interfax Mining and Metals Report, 2001az).

Commodity Review

Amber

Russia's only amber producer, Kaliningrad Amber Works, was the world's largest amber producer and produced 441.8 t of amber in 2000 compared with 364.5 t in 1999 and 512.2 t in 1998. In 2000, the majority of amber produced was in small stones. Only about 25% of the amber produced was used in production, and the remainder was left in storage. The Kaliningrad region contains 95% of the world's amber deposits. Kaliningrad Amber Works had licenses to develop three amber deposits. At two of these deposits, the Primorskoye and the Palmnikenskoye, it produced 42.5 t and 322 t, respectively, in 1999; at the third, the Filino deposit, work was at a standstill (Interfax Mining and Metals Report, 2001c).

Aluminum

Armenia.—The Kanaker aluminum foil plant, which is part of Armenal CJSC (a joint venture between the Government of Armenia and Siberian Aluminum Group of Russia, which owned 44% of the shares), produced 1,286 t of foil in 2000. Plans called for Armenal to increase foil output to 1,000 metric tons per month in 2001, which was to be achieved by upgrading capacity that had been idled. The foil is intended for export. In 2001, Armenia intended to obtain International Organization for Standardization (ISO) certification for its foil products (Interfax Mining and Metals Report, 2001d).

Azerbaijan.—Azerbaijan Aluminum Co. controls the Sumgait alumina smelter, the Gyandzha alumina refinery, the Zaglik alunite mining company, and the Dashkesan iron ore mining company. Fondel Metals International B.V. of the Netherlands was awarded a tender by the Azerbaijan Ministry of State Property to manage Azerbaijan Aluminum Co. for 25 years. The terms of the tender called for Fondel to invest a total of $3 billion, with $300 million in the first 3 years, and to raise output within 3 years of signing the contract (February 2001) to 29,000 t/yr of aluminum and between 850,000 t/yr and 1.25 Mt/yr of alumina (Interfax Mining and Metals Report, 2001f).

Kazakhstan.—Kazakhstan has two large bauxite mining enterprises, Turgayskiy and Krasnooktyabr'skiy, with a combined capacity to produce 3.5 Mt/yr of bauxite. These mines supply the Pavlodar aluminum plant with a capacity to produce more than 1 Mt/yr of alumina. Pavlodar, despite its name, does not produce aluminum (Bronevoy and Lankin, 2001). In 2000, the bauxite mines produced 3,729,000 t, which was 3.4% more than in 1999, and Pavlodar produced 1,209,000 t of alumina, which was 4.9% more than in 1999. The Turgayskiy and Krasnooktyabr'skiy bauxite mines, the Keregetas limestone quarry, and the Pavlodar alumina refinery were under the control of Aluminum of Kazakhstan, which had 10,839 employees. The Evraziiskiy Bank owned the controlling interest in Aluminum of Kazakhstan and the Government of Kazakhstan owned 31.64% (Interfax Mining and Metals Report, 2001m).

Russia.—Russia was the world's second largest aluminum producer after the United States. In 2000, Russia's aluminum production increased by 2.5%, and its exports, by 4% in comparison with those of 1999 (Interfax Mining and Metals Report, 2001ag). Its industry included 11 aluminum smelters and 5 alumina refineries. Russia produced about 40% of the alumina it required. The aluminum industry consumed about 10% of the country's total electricity consumption, and the large smelters were developed in conjunction with major hydroelectric powerplants in Siberia. About 85% of the country's bauxite and 65% of its alumina was produced in the Urals. Problems existed with the industry's inadequate raw materials base and with the need for modernization of the plants, particularly in the area of energy-saving technologies. Almost all aluminum produced in the country was exported (Sizykov, 2000).

Tajikistan.—Tadaz produced 300,000 t of aluminum in 2000, which was 70,000 t more than in 1999. Tadaz was able to increase output because there was no interruption in alumina supplies from Azerbaijan and Kazakhstan as well as no interruptions in electrical supply from the Nurek powerplant. Almost all the alumina is exported, and aluminum accounted for 55% of the country's total export revenues (Interfax Mining and Metals Report, 2001at).

Ukraine.—Ukraine's Mykolayiv refinery was among the world's largest alumina-producing plants with the capacity to produce about 1.2 Mt/yr of alumina and employing about 6,500 workers (Interfax-M&CN, 1998). Ukraine also produced a much smaller amount of alumina at the Zaporozh'ye aluminum smelter as feed for the smelter. Mykolayiv exported about 90% of its output, primarily to Russia and Tajikistan.

In 2000, the Zaporozh'ye aluminum smelter produced 103,591 t of primary aluminum, which was 7.8% less than that in 1999, with the drop in production attributed to insufficient electricity supplies. Zaporozh'ye also produced 246,450 t of alumina, which was an increase of 3.5% in comparison with that of 1999, and 6,153 t of technical silicon, which was 32.2% more than it produced in 1999. Zaporozh'ye is 93.1% state-owned, with the employees and management owning the remaining shares (Interfax Mining and Metals Report, 2001bi).

Barite

Kazakhstan.—Kazakhstan had produced more than 75% of the FSU's barite output. Barite was produced by companies mining primarily polymetallic and lead-zinc deposits, although some barite was produced at barite deposits (Daukeev, 1995, p. 116). Barite was produced at 2 barite deposits in southern Kazakhstan and 11 sulfide deposits in the central, eastern, and southeastern parts of the country (Kruse and Parchmann, 1998, p. 85). The Kargayly and Zhayrem deposits accounted for the majority of output. Barite concentrate was produced by flotation at nonferrous metallurgical enterprises and was of low quality owing to the presence of flotation reagents (Daukeev, 1995, p. 116). The main consumers for Kazakhstan's barite were oil drilling and exploration enterprises in Kazakhstan and Uzbekistan (Kruse and Parchmann, 1998, p. 85).

Kazakhstan's oil companies required 200,000 t/yr of barite. Many oil industry enterprises, however, were refusing to use Kazakhstan's barite because of its low quality (Daukeev, 1995, p. 118). These companies imported barite mainly from Turkey and Iran (Interfax Central Asia & Caucasus Business Report, July 30, 2001, Yuzhpolimetal plans to boost output, accessed September 21, 2001, via URL http://fbis.fedworld.gov).

The Yuzhpolimetall ore processing company, established in summer 1999 based on the bankrupt Shymkent lead plant, planned to produce more than 70,000 t of barite in 2001, in addition to lead, zinc, and silver. It planned to process raw materials from ore deposits and tailing dumps of the Achisay complex (South Kazakhstan region). Yuzhpolimetall also expected to receive licenses to develop several small polymetallic and barite ore deposits in south Kazakhstan and Karaganda (Interfax Central Asia & Caucasus Business Report, July 30, 2001, Yuzhpolimetal plans to boost output, accessed September 21, 2001, via URL http://fbis.fedworld.gov).

Russia.—The projected growth in volume of oil and gas production will require the consumption of 850,000 to 900,000 t/yr of drilling grade barite by 2010. Despite large barite resources, only a small percentage of these resources is of adequate quality and economical to exploit. Existing operating facilities will not be able to produce sufficient amounts, and the country will seek to import barite, primarily from China and Kazakhstan (Aksenov and others, 2000).

Chromite

The Donskoy mining and beneficiation complex in Kazakhstan, which was part of Kazkhrom, increased its output by 8.4% in 2000 in comparison with 1999 to 2.61 Mt. The largest mine at Donskoy, the Molodezhnyy underground mine, increased output by 3% to 1.7 Mt. The Tsentral'nyy underground and the Poiskovyy open pit mines at Donskoy were commissioned in 1999. The largest consumers of chromite from Donskoy were the Aksu and Ferrkhrom ferroalloy plants in Kazakhstan, which were part of Kazkhrom, the Aktyubinsk chemicals compound plant in Kazakhstan, and ferroalloy producers in Russia. Reportedly, Kazakhstan Mineral Resource Corp. owned 28.7% of Kazkhrom, and the Government of Kazakhstan, 31.3% (Interfax Mining and Metals Report, 2001h).

Coal

Kazakhstan.—In 2000, Kazakhstan produced 75 Mt of coal, which was 28% more than in 1999. Production growth was sustainable in part owing to reduced rail transport costs. Kazakhstan planned to produce 80.5 Mt of coal in 2001 (Interfax Mining and Metals Report, 2001p).

Bogatyr Access Komir Ltd. (a subsidiary of Access Industries Inc. of the United States) was developing the Bogatyr' and Severnyy open pit mines in northern Kazakhstan and produced 35.8 Mt of coal in 2000. Euroasian Energy Corp. produced about 16 Mt at the Vostochny open pit mine in the Pavlodar region, which was 44.28% more than in 1999 (Interfax Mining and Metals Report, 2001p).

Kyrgyzstan.—In 2000, Kyrgyzstan increased coal production by about 2% to 424,900 t. The country's largest producer, Kyrgyzkomur, produced 320,700 t, which was an increase of

5% compared with that of 1999 (Interfax Mining and Metals Report, 2001w).

Russia.—In 2000, Russia's coal production increased to more than 257 Mt, which was about 6.5 Mt more compared with that of 1999 (Interfax Mining and Metals Report, 2001al). The growth in extraction was from enterprises in West and East Siberia, where output increased by 10.6 Mt. These regions produced about 75% of the country's coal. In other coal mining regions of the country, output fell by 3.1 Mt (table 6). Output of coking coal increased by 3.4 Mt compared with that of 1999 to 60 Mt, of which the Kuznetsk Basin accounted for 76.6% of production (table 6). In 2000, the country produced 83.74 Mt of brown coal and 170.2 Mt of hard coal, including 1.05 Mt of anthracite. In 2000, 89.2 Mt of coal was extracted from underground mines, which was 800,000 t more than that of 1999, and 164.7 Mt was mined from open pits, which was 6.7 Mt more than that of 1999 (Ugol', 2001a). [A discrepancy exists in the coal production numbers published by the Russian State Statistics Committee in the Interfax Mining and Metals Report and by the coal industry journal Ugol'. Both numbers are reported with the assumption that the numbers reported by Ugol' do not include all enterprises mining coal.]

The role of coal as a fuel for domestic electric energy generation was increasing. In 2000, coal accounted for 32% of the fuel used to generate electric power at thermal electric powerplants in comparison with 29% in 1999 (Ugol', 2001b).

In 2000, exports of coal increased, while deliveries to the domestic market decreased compared with those of 1999. The growth in exports went to countries outside the FSU, while there was a decrease in exports to countries of the FSU. In 2000, compared with those of 1999, imports of coal increased by 10.2 Mt (64%) to 26 Mt, which was mainly due to regional deficiencies in supply (Ugol', 2001a).

The Russian coal industry releases into the atmosphere more that 1.5 billion cubic meters per year of methane. The country was developing technology to use the methane as a source of energy. Identified coal bed methane resources were reportedly almost 50 billion cubic meters (Malyshev and Trubetskoy, 2001; table 7).

Tajikistan.—In 2000, Tajikistan produced 20,700 t of coal, which was 4,100 t (24.7%) more compared with that of 1999. The country's main coal producer Leninabadugol, which mined the Shurab field, produced 11,600 t, and its subsidiary Fan-Yagnob, 9,100 t. Leninabadugol was engaged in a joint venture with Angisht of Uzbekistan, which will provide coal to Uzbekistan's Fergana Valley. Tajikistan planned to increase production to 30,000 t in 2001. Plans called for developing the Nazarailok mining enterprise at a coalfield in Karategi Valley in eastern Tajikistan.

Tajikistan has six coalfields with proven reserves at Fan-Yagnob (Pyandzh region) totaling around 2 Gt. The Shurab brown-coal-field, one of the larger fields not far from Isfara, was the main supplier of coal for Tajikistan and various regions in Uzbekistan and Kyrgyzstan. Before the breakup of the Soviet Union, it produced up to 650,000 t/yr of coal (Interfax Mining and Metals Report, 2001au; Central Asian News, [undated], Tajikistan on line, accessed October 19, 2001, at URL http://www.can.naytov.com/ingl/july_august/td6.htm).

Ukraine.—In 2000, Ukraine mined about 81 Mt of coal, which was about 1% less than in 1999 and short of the target of 82 Mt. The country had 191 operating open pits (Interfax Mining and Metals Report, 2001ax). In 2001, the Ukrainian Government planned to close 19 unprofitable underground mines and 2 open pits (Interfax Mining and Metals Report, 2001bb). Approximately 600,000 workers were employed in the coal-mining sector. An average miner reportedly produced about 100 t/yr of coal (U.S. Energy Information Administration, August 2000, Country analysis briefs—Ukraine, accessed November 29, 2000, at URL http://www.eia.doe.gov.emeu/cabs/ukraine.html).

More than 90% of Ukraine's coal production was from the Donets Basin. Mines in the Donets Basin were deep, with the average mine depth about 700 meters (m). A significant number of mines were more than 1,000 m deep. In all mines in the Donets Basin, methane gas posed a serious danger, and the safety risks from gas and dust were increasing. As of the mid-1990s, 80% of the coal mined from the Donets Basin required processing to be marketable, and this percentage was projected increase to 90% (Bundesanstalt fuer Geowissenschaften und Rohstoffe, 1996, p. 35-41).

Uzbekistan.—Coal production in Uzbekistan decreased to about 2.5 Mt in 2000, which was about 15% less compared wit that in 1999. All coal was produced by the national coal company Ugol', which mined about 2.4 Mt of brown coal in 2000, a decrease of 15.9% compared with that in 1999, and 91,500 t of hard coal in 2000, which was an increase of 2.7% compared with that of 1999. It mined about 2.1 Mt (82.4%) by open pit mining, and the remainder, by underground mining. Ugol' developed the Angren lignite field in the Tashkent region and the Shargun hard coal deposit in the Surkhandarya region. It was exploring the Baisun hard coal field, which was also in the Surkhandarya region. Uzbekistan's total commercial reserves were reportedly about 3 Gt, of which 1 Gt was hard coal.

Ugol' mined more than 90% of its coal at the Angren field. The Angren deposit reportedly has 1.9 Gt of proven coal reserves. It was mined by an open pit and an underground mine. The Podzemgaz station at Angren mined coal seams to obtain gas by an underground gasification method. The station's capacity was 600 million cubic meters per year of gas.

Germany's Krupp Fordertechnik GmbH won a tender to upgrade the Angren open pit. Coal production at Angren woul increase to 5 Mt/yr. Ubekistan's domestic coal requirement wa estimated to be 4 Mt/yr (Interfax Mining and Metals Report, 2001bf).

Copper

Armenia.—The Manes-Vallex smelter in Alaverdi was established in 1997 by the Manes metallurgical plant of Alaverdi and Vallex F.M. Establishment of Liechtenstein. The smelter was constructed on the base of the Alaverdi mining and metals complex, which was closed in 1989. Vallex owned 53.7% of the Manes-Vallex stock. Elecom Co., Ltd., of Switzerland bought the 46.3% held by Manes in 1998. In 2000, Manes-Vallex produced 7,200 t of blister copper, nearly all of which was sold to Germany's Norddeutsche Affineri AG. Manes-Vallex planned to produce between 12,000 and 14,000 t of blister copper in 2001; it had the capacity to smelt 15,000 t/y of blister copper (Interfax Mining and Metals Report, 2001g, x).

Kazakhstan.—The country's copper-producing monopoly Kazakhmys Corp. produced 394,723 t of refined copper in 2000, which was a 9% increase compared with the 361,890 t it produced in 1999. In Kazakhstan, about 90% of copper metal production capacity was being used (Interfax Mining and Metals Report, 2001l; Kozyrev and Karmanov, 2001).

Growth in production was due in part to the commissioning of new mines in the Karaganda region and in southern Kazakhstan, including the Sayak and Shatyrkol mines in the Zhezkazgan region, and also in part to increased recycling of slag (Interfax Mining and Metals Report, 2001l).

Kazakhmys consisted of mines, factories, and heating plants from the Zhezkazgan district, the Balkhash mining and metals complex (formerly Balkhashmys), combined heat plants and powerplants from Zhezkazagan and Balkhash, a copper wire rod mill, the Borly coal mining enterprise, the VostokKazMed enterprise (West Kazakhstan region), and other enterprises. It was a shareholder and cofounder of Zhezkazgangeologiya and the Kazakhmys Pension Fund, among other enterprises. Samsung Group of the Republic of Korea owned 40% of the shares of Kazakhmys; the Kazakhstani Government, 35%; employees, 20%; and investment funds, 5% (Interfax Mining and Metals Report, 2001l).

Russia.—Russia possesses about 10% of the world's copper reserves (International Copper Study Group, 1998). The majority of reserves are in copper-nickel sulfide and pyrite ores. More than 50% of reserves is in deposits already under development. Ore grades were reportedly competitive with other producing deposits in the world (Kozlovskiy and Shchadov, 1999; Novikov and Yastrzhembskiy, 1999). Approximately 70% of the country's reserves is in East Siberia; 20%, in the Urals; and 10%, in the North Caucasus (Haeusser and others, 1994, p. 9). About 65% to 70% of ore mined was from copper-nickel sulfide deposits, and the remainder, from pyrite ores.

In 2000, Russia ranked seventh in the world in mine output of copper (Edelstein, 2001). The Noril'sk complex in East Siberia, the country's major copper mining enterprise, produced more than 70% of the country's copper and was mining copper-nickel sulfide ore with an average copper content of about 5%. The remainder of the country's copper was produced at mining and metallurgical enterprises in the Urals region.

In contrast to ores mined by Noril'sk, ores in the Urals and Caucasus regions are from copper pyrite and copper-zinc pyrite deposits and not as economically competitive with other deposits in world. These are complex ores containing cadmium, copper, gold, silver, zinc, and other metals, but the total value of ore constituents is lower than that of Noril'sk ores. The copper content of these ores in the largest developed deposits does not exceed 1%, and the zinc content, 1.8%, and these deposits are almost depleted, having been worked for a long period of time (Novikov and Sazonov, 2000).

Most of the copper-producing enterprises in the Urals were consolidated into the Urals mining and metallurgical complex (UGMK). In 2000, it controlled four smelters that produced 224,300 t of blister copper and the Uralektromed refinery, which produced 311,000 t of refined copper. The UGMK was in the process of acquiring the Karabashmed smelter and the Kyshtym refinery to complete its holdings in the Urals (CRU International Ltd., 2001).

In the Urals, growth in reserves in the near term would be in areas contiguous to existing reserves and beneath existing reserves. Underground mines were being developed beneath the Molodezhnyy, the Sibay, and the Uchali open pits owing to the depletion of reserves suitable for open pit development. Copper mines were being developed at the Aleksandrinskoye deposit, which was part of the Mednogorsk complex; the Letnyeye deposit to supply the Gai complex; and the Saf'yanovskoye deposit, which is at the Rezh nickel plant (Kozlovskiy and Shchadov, 1999; Novikov and Yastrzhembskiy, 1999).

At Noril'sk, the Oktyabr'skiy underground mine was producing almost 70% of Noril'sk's copper mine output. Almost all the remaining mine output of copper at Noril'sk came from the Komsomol'skiy and the Taymyrskiy underground mines (Piven' and others, 1999). Oktyabr'skiy planned to mine a greater quantity of cuprous ore and a lesser amount of rich ores with a high nickel content, which were being depleted. Plans called for increasing cuprous ore production at Oktyabr'skiy to 1.6 Mt/yr from 100,000 t/yr in 1999. During this same period, production of rich copper-nickel ores was to decrease to 3.4 Mt/yr from 4 Mt/yr (Piven' and others, 1999). The cuprous ores at Noril'sk are more than 40% higher in copper content than the nickel-rich ores (Natural Resources Canada, unpub. data, 1999).

Uzbekistan.—The Almalyk mining and metallurgical complex produced refined copper (cathodes), gold, and silver; metallic zinc; lead concentrate; and other products. It had the capacity to mine and process about 25 Mt/yr of ore and produce about 100,000 t/yr of refined copper. In 2000, the Government set the production target for Almalyk at 75,000 t of refined copper and also set the same target for 2001. In the first 8 months of 2000, the complex produced 46,831 t of refined copper, which was 7% less than in the same period of 1999. It also produced 46,103 t of metallic zinc, which was 1.7% more than that of 1999, and increased production of gold and silver by 0.2% and 7.9% respectively (Interfax Mining and Metals Report, 2001j).

The Uzbek Government owned 51%, and employees, 2.5% of the shares of Almalyk. In 1999, the Uzbek Property Committee tried but failed to sell 46.5% of its shares in Almalyk in a tender that did not draw any bids. Almalyk was then entered on a list of enterprises to be privatized in 2001 to 2002, and the Government was conducting talks with potential foreign investors (Interfax Mining and Metals Report, 2001bg). The Government had allowed Almalyk to export its own copper, rather than going through state-owned trade companies. The Government, however, was continuing to export Almalyk's zinc. Almalyk held the right to develop copper-molybdenum and lead-zinc deposits near the city of Omaliq (formerly Almalyk) in the Tashkent region (Interfax Mining and Metals Report, 2001j).

Diamond

Practically all Russian diamonds were mined by Almazy Rossii-Sakha Joint Stock Co. Ltd. (ALROSA) from kimberlite deposits near Mirnyy in the Sakha (Yakutiya) Republic. ALROSA was a corporation established by the Russian Government. It produced 99.8% of Russia's total diamond production and had a monopoly right to export rough diamonds. The company's production was valued at $1.623 billion in 2000 compared with $1.41 billion in 1999. The company intended to increase mine output in the coming years and was planning for the value of rough diamond output to reach $1.67 billion in 2002, $1.69 billion in 2003, $1.794 billion in 2004, and $1.934 billion in 2005. ALROSA also was increasing its diamond-cutting capabilities. In profit volume, ALROSA was among the top 10 Russian companies. It employed more than 39,000 people, or 75% of all people working in the Russian diamond industry.

ALROSA amalgamated the main links of the country's diamond industry, such as geologic exploration, capital construction, transportation, mining, ore-dressing, sorting, evaluation, diamond trade in the domestic and foreign markets, and industry-related research. It was performing surveys and exploration in six diamond regions of Yakutiya as well as in the Krasnoyarsk and Irkutsk regions. In 1999, ALROSA began geologic exploration in Arkhangel'skaya oblast', and a project in Karelia was slated to start in which ALROSA would be involved in joint diamond exploration with Australia's Ashton Mining Ltd. In 2000, ALROSA acquired from De Beers Group its 39% share of Severalmaz, which was involved in diamond mining activity in Arkhangel'skaya oblast'. ALROSA also had the diamond mining joint venture Catoca, which was operating in Angola, and was planning to start exploration in Namibia.

Additionally, ALROSA was increasing its diamond-cutting capabilities. The company was developing the Almazny Dvor project, aimed at selling exclusive jewelry and certified diamonds in Moscow (Sachs Associates, [undated], Companies—Alrosa, accessed October 4, 2001, at URL http://www.sachsforum.com/ldn_iir/ldn_sponsors.html).

ALROSA's main production unit was the Udachny mining and processing complex, which developed the Udachny and Zarnitsa diamond deposits and produced more than 80% of ALROSA diamonds; ALROSA's Mirnyy mining and processing complex developed the Mir and International diamond deposits and produced high-quality diamonds; the Aikhalsky mining and processing complex developed the Aikhal and Jubilee diamond deposits, and the Anabar placer mine developed the Anabar placer deposit (Basel Magazine, 1999; Interfax Mining and Metals Report, 1999a; Vaganov and others, 1999).

An agreement signed in the fall of 1998, which would expire in December 2001, gave ALROSA the right to sell to De Beers at least $550 million per year worth of uncut diamonds, provided that it amounted to no more than 26% of De Beers annual sales. Russia also had the right to sell on the free market 5% of its newly mined diamonds and 20% of its supplies in state reserves (Interfax Mining and Metals Report, 2001b; Russian Journal/Online, September 3, 2001, Disagreement between Russia, Debeers, accessed October 11, 2001, via URL http://www.russiajournal.com/news/index.shtml).

Ferroalloys

Kazakhstan.—Kazakhstan was the major producer of chromite in the CIS and also produced some manganese ore. Kazakhstan's two major ferroalloy plants, the Ferrokhrom and the Aksu, were part of Kazkhrom [owned by Kazakhstan Mineral Resource Corp. (28.75%) and the Kazakhstani Government (31.1%)]. In 2000, the Ferrokhrom enterprise produced 271,600 t of ferroalloys, which was a 4.5% increase compared with that of 1999. The enterprise produced high-, medium-, and low-carbon ferrochromiumsilicon. The enterprise did not make ferrosilicon in 2000, but resumed its production in 2001 (Interfax Mining and Metals Report, 2001i). The Aksu ferroalloy plant produced approximately 800,000 t of ferroalloys in 2000 compared with 734,000 t in 1999. Aksu produced ferrochrome, ferrochromiumsilicon, silicomanganese, and ferromanganese (Interfax Mining and Metals Report, 2001a).

Russia.—Russia lacked significant production of two of the major minerals used in ferroalloy production, chrome and manganese, which were produced mainly in Kazakhstan and Ukraine, respectively, during the Soviet period and subsequently. During the Soviet period, Georgia had been a significant producer of manganese, but production had fallen sharply in the past decade. Russia produced mainly electric furnace chromium and silicon ferroalloys, blast furnace ferromanganese, and ferroalloys from other metals, such as molybdenum, nickel, titanium, tungsten, and vanadium. In 2000, Russia increased production of ferroalloys by 5.6% compared with that of 1999. Production increased by 8.4% to 652,000 t of 45%-ferrosilicon and by 2.6% to 274,000 t of 60%-ferrochrome. Among the country's major ferroalloy producing enterprises, the Chelyabinsk electrometallurgical complex produced 290,000 t of ferrosilicon and 140,000 t of ferrochrome. The Kuznetsk ferroalloys plant in the Kemerovo region produced 321,500 t of 45%-ferrosilicon and the Kosaya Gora works in Tula produced 70,700 t of blast furnace ferromanganese (Interfax Mining and Metals Report, 2001aj).

Ukraine.—Ukraine was the major producer of manganese in the CIS. Ferroalloy plants in Ukraine produced only manganese and silicon ferroalloys owing mainly to a lack of domestic resources of other alloying minerals; the country imported these other ferroalloys. The Nikopol' ferroalloys plant in Ukraine specialized in the production of silicomanganese and high-carbon ferromanganese and had begun production of medium-carbon ferromanganese. The Zaporozh'ye ferroalloys plant produced manganese ferroalloys (silicomanganese, all grades of ferromanganese, and manganese metal) and silicon ferroalloys (all grades of ferrosilicon). The basic product of the Stakhanov ferroalloys plant was ferrosilicon of all grades. Previously, about 100,000 t of blast furnace ferromanganese was produced at the Konstantinovskiy and Kramatorskiy metallurgical plants, but production at Kramatorskiy ended in 1999.

The decline in steel production in Ukraine resulted in a change in the production profile of ferroalloys. Domestic demand for ferroalloys in 2000 was between 300,000 and 350,000 t for manganese ferroalloys and about 200,000 t for silicon ferroalloys, equaling about 40% of the volume of domestic ferroalloy production; the remaining production was exported to CIS countries and to other countries of the world. Within the CIS, 90% of exports went to Russia. In 2000, Russia imported 322,200 t of ferroalloys from Ukraine, of which 57.9% was silicomanganese, and 42.1%, ferromanganese. Only electric furnace ferroalloys were exported outside the CIS. Ukraine envisioned declining future exports to the CIS with the increase of domestic ferroalloy production from Kazakhstan and Russia and producing a wider assortment of ferroalloys, particularly ferrochrome, based on imported chromite and new domestic production and ferrotitanium and ferrosilicozirconium based on domestic raw materials.

Total ferroalloy production in Ukraine had decreased to an estimated 1,380,000 t in 2000 from 2,378,000 t in 1990. During this period, production of silicomanganese decreased to 684,040 t from 1,209,000 t, ferrosilicon to 323,417 t from 594,000 t, and manganese metal to 3,500 from 37,500 t. During this period, however, production of low- and medium-carbon ferromanganese increased to 17,400 t from 3,500 t; the percentage of high-carbon electric furnace ferromanganese increased, and the percentage of blast furnace ferromanganese, ferrosilicon, and manganese metal decreased (Koval and others, 2001; U.S. Geological Survey, unpub. data, 2001).

Gold

Kazakhstan.—In 2000, Kazakhstan mined about 28 t of gold including byproduct gold, which was almost 40% greater than that of 1999. Plans called for Kazakhstan to increase nonbyproduct gold production to 17 t in 2001 from 15 t in 2000 (Moscow Interfax in English, December 15, 2000, Kazakh gold production up, accessed October 13, 2001, via URL http://fbis.fedworld.gov). In 2000, the Kazakhmys copper production association produced 4.074 t of byproduct gold in ingots compared with 2.319 t in 1999 (Interfax Mining and Metals Report, 2001l). In 2000, Kazakhstan's national zinc corporation Kaztsink produced 5.845 t of byproduct gold (Interfax Mining and Metals Report, 2001s). Two major gold mining gold mining projects [named for the deposits that were under development]—Altyn Aimak Mining and Smelting Corp. (a Kazakh corporation) and Bakyrchik Gold plc [a joint venture with Canada's Indochina Goldfields Ltd. (90%)]—were working on methods to treat ores from these deposits that have high arsenic and carbon contents (Mining Journal, 2001).

In 2000, Kazakhstan produced 11.5 t of refined gold, which was a 19% increase compared with that of 1999 (Interfax Mining and Metals Report, 2001o). Before the breakup of the Soviet Union, Kazakhstan had no gold refineries but subsequently acquired three located at the Ust-Kamenogorsk metallurgical complex; at Balkhshmys, which is part of the copper production company Kazakhmys; and at the Tselinyly mining and metallurgical complex.

Kyrgyzstan.—In 2000, Kumtor Gold Co. [a joint venture between Canada's Cameco Gold Inc. (30%) and the Kyrgyz Government-owned mining company Kyrgyzaltyn (70%)] increased its output by 10% to 21.5 t in comparison with that of 1999. Kumtor increased ore extraction by 200,000 t and increased its gold recovery rate from ore by 2.7% in comparison with that of 1999. The gold recovery rate in 2000 was 81.5%, which was 2% higher than projected in the feasibility study (Interfax Mining and Metals Report, 2001v).

Russia.—In 2000, Russia ranked sixth in the world in gold production, with gold output increasing by 13.2% to 143 t in comparison with that of 1999 (Interfax Mining and Metals Report, 2001ai; U.S. Geological Survey, unpub. data, 2001). Of this amount, 131 t was mined as primary gold, 7 t was mined as byproduct gold, and 5 t was produced from tailings. Russia's gold holdings were about 300 t, ranking it 13th in the world in terms of gold stocks. The majority of Russia's gold reserves (73.6%) are in East Siberia and the Russian Far East, with 80% of the reserves located in lode deposits, and 20%, in placer deposits. Of the gold mined, however, 60% was from placer deposits where reserves were adequate for only another 15 to 20 years. Russia had between 500 and 700 companies that were mining less than 100 kilograms per year of gold and only 20 companies producing more than 1 t/yr of gold. One of the most prominent examples of foreign investment was the development of the Kubaka gold mine by Omolon Gold Co. in which Canada's Kinross Gold Corp. owned a 55% share of the stock (Dobrynin, 2001a).

Tajikistan.—In 2000, the Zeravshan Gold Co. [owned by Canada's Commonwealth and British Minerals (44%), the International Finance Corp. (5%), and the Government of Tajikistan (51%)] produced 2.41 t of gold at the Jilau deposit in comparison with 1.6 t in 1999. Output for 2001 was targeted to be 2.5 t (Interfax Mining and Metals Report, 2001bj).

The Darvaz joint venture [owned by the United Kingdom's Gold and Minerals Excavation Inc. (49%) and the Government of Tajikistan (51%)] produced 167.3 kilograms (kg) of gold in 2000 from the Yakhsu placer deposit, which extends 756 km along the bottom of the Yakhsu Valley and reportedly contains 25 t of gold. The joint venture did not mine gold between 1997 and 1999 because its equipment was severely damaged as a result of hostilities in that region. Plans call for the Darvaz joint venture to produce 600 kg of gold in 2001 (Interfax Mining and Metals Report, 2001av).

Uzbekistan.—Uzbekistan's explored resources of gold were estimated to be about 5,300 t. The main reserves of gold, amounting to about 3,200 t, are in the central Kyzylkum region containing the Muruntau deposit. The Muruntau gold deposit was the largest deposit of gold in Eurasia and was considered to be among the largest deposits of gold in the world. As of January 1, 1996, reserves of gold at Muruntau were reported to be 2,230 t. Undiscovered resources to a depth of 1,500 m could add another 1,800 t of gold. Muruntau's milling operation processed more than 22 Mt/yr of ore (U.S. Trade and Development Agency and State Committee of Geology and Mineral Resources of the Republic of Uzbekistan, 1996, p. 23).

The leading foreign investor in Uzbekistan's gold industry was Newmont Corp. of the United States, which had a 50% interest in the Zarafshan joint venture along with an Uzbek Government conglomerate (50%), comprising the State Committee of Geology and Natural Resources and the Navoi mining and beneficiation complex. Zarafshan processed gold bearing tailings from the Muruntau gold mining operation. When the joint venture was established, the Uzbek Government determined the raw material base for the joint venture to be 220 Mt with an average gold content of 1.4 grams per metric ton (g/t) gold.

In 2000, Zeravshan produced 15.434 t of gold compared with 16.7 t in 1999. The fall in gold production was attributed to changes in the raw material base at the joint venture because the extraction plant received material with lower gold content than in 1999. During the first stage of operations (about 5 years), the joint venture processed 60 Mt containing an average 1.6 g/t gold, with an extraction ratio of 65%. During the second stage (about 10 years), it planned to process material with a reduced gold content of 1.1 g/t gold, with an extraction ratio of 50%.

At the end of 2000, the European Bank for Reconstruction and Development granted Zeravshan a credit of $30 million to build additional leaching cushions and necessary infrastructure for extracting gold from tailings. This would enable Zeravshan to continue operating until 2015 and to increase gold production (Interfax Mining and Metals Report, 2001bk).

Iron and Steel

Moldova.—The Moldovan steel minimill in Ribnita produced 905,000 t of crude steel and 635 t of rolled steel in 2000, despite production being down for a month owing to a disruption in energy supplies. The international energy company Itera owns 75% of the shares, and the minimill exports more than 90% of its output. Investment plans call for the mill to be modernized and its capacity to be raised to 1.3 Mt/yr of crude steel and 900,000 t/yr of rolled steel (Interfax Mining and Metals Report, 2001y).

Russia.—Between 1990 and 2000, Russia's steel production had decreased to 59.1 Mt from 89.6 Mt, although during 1999 and 2000 steel production increased. Additionally, there was a significant change in steelmaking methods and products during the past decade. The amount of steel produced in open hearth furnaces declined by almost 50%, and the amount of steel produced by continuous casting increased to almost 50% of output compared with 27.4% in 1991. The production of cold-rolled sheet and coated steel increased. The country, however, produced less alloyed steel, including stainless. In 2000, open hearth furnace production accounted for 27% of steel production, oxygen converters, 58%, and electric furnaces, 15%; 49.8% of steel was produced using continuous casting. Cold-rolled sheet accounted for 31.7% of rolled output, and coated sheet, 6.9%. Alloyed steel accounted for 5.2% of finished rolled output compared with 14.1% in 1991, and stainless steel accounted for 0.2% of finished rolled output compared with 1.4% in 1991 (Brodov and others, 2001).

With the devaluation of the ruble in 1998, profitability in the steel industry improved, and in 2000, profits increased by 28%. The percentage of enterprises operating at a loss decreased to 26% in 2000 from 43.8% in 1998. About 98% of all steel production was by private enterprises, with 94% of all steelmaking enterprises privatized. The major source of investment funds for enterprises remained their own earnings. During the past decade, practically all investment was centered in nine large steelmaking enterprises (Chelyabinsk, Cherepovets, Kuznetsk, Magnitogorsk, Nizhniy Tagil, Novolipetsk, Orsko-Khalilovo, Oskol, and West Siberian), which produced about 90% of the country's rolled output (Brodov and others, 2001).

Russia had become the leading country in the world in total volume of rolled steel exports. The volume of exports in recent years had ranged between 26 and 27 Mt/yr. Russia exported about 43% of its production of rolled finished steel output. However, much of the steel exported was of lower quality and less value-added steel. The large surge in exports was the result of the decline in domestic demand. In 2000, however, for the second consecutive year, domestic demand for steel rose, reaching 23 Mt of steel products compared with 16.9 Mt in 1999 (Bol'shakov and Tubol'tsev, 2001; Brodov and others, 2001).

Owing to Russia's large export of ferrous metals, a number of countries, including China, countries of the European Union (EU), India, and the United States, had taken action to restrict Russia's exports (Interfax Mining and Metals Report, 2001as). General agreements between Russia and the EU pertaining to steel exports have been signed since 1994. The agreement in effect in 2000 was signed in 1997 and would expire in December 2001 (Interfax Mining and Metals Report, 2001af). The United States had reduced sharply the level of Russian steel imports in recent years. In 1999, Russia signed two agreements on steel quotas with the United States, with one quota for all steel products and one for hot-rolled steel. Russia had the right to export to the United States 325,000 t of hot-rolled steel in 2000 and 465,000 t in 2001. Russia was allowed to supply the United States with 465,000 t/yr of cold-rolled steel. Owing to having met these quotas by the summer, Russia was prevented from exporting any more steel to the United States for 2000 (Interfax Mining and Metals Report, 2001ah). These accords with the United States were concluded as a means of averting an antidumping investigation. Russia was seeking to have its status changed to that of a market economy country via accession to the World Trade Organization, which Russian steelmakers believed would alter the ability of countries to levy trade restrictions on Russian steel exports (Interfax Mining and Metals Report, 2001ao).

The steel industry consumed about 10 Mt/yr of scrap. The demand for scrap would increase with the planned increase in electric steel production. Efforts were called for to regulate the scrap collection industry (Brodov and others, 2001).

Ukraine.—Ukraine's ferrous metals production increased by 17% in 2000 in comparison with that of 1999. The largest increase was for steel pipe production, which increased by 41.5% to 1.67 Mt. Production increased by 17.2% for pig iron to 25.7 Mt, and by 11% for crude steel to 31.8 Mt, which was the highest production total for crude steel achieved in the past 7 years. Coke output increased by 11.6% to 19.3 Mt, and iron ore output increased by 17% to 55.9 Mt. The quantity and quality of coking coal produced were not adequate for the needs of the steel industry, and the industry had to import more than 3.8 Mt of coking coal in 2000, with more than 3 Mt supplied by Russia (Interfax Mining and Metals Report, 2001be). In Ukraine, open hearth production accounted for 48% of all steel produced (Kozyrev and Karmanov, 2001). In 2000, continuous casting accounted for 19% of steel produced compared with 9% in 1995. Ukraine's metals industry was adversely affected by the lack of domestic markets, depreciating equipment, inadequate use of state-of-the-art technology, high energy and materials costs, and inadequate employment of technologies for pollution reduction. About 80% of all metal products produced was exported (Bol'shakov and Tubol'tsev, 2001).

As of June, more than 100 antidumping investigations had been leveled against Ukraine by 13 countries. At the end of 2000, the U.S. International Trade Commission stated that steel exports from Ukraine may be damaging U.S. industries and that duties would be imposed if it could be confirmed that subsidized steel was being dumped (Interfax Mining and Metals Report, 2001ba). Ukraine and the United States were in the process of trying to negotiate an agreement on quotas for Ukrainian steel exports to the United States (Interfax Mining and Metals Report, 2001az).

Iron Ore

Kazakhstan.—In 2000, Kazakhstan increased iron ore production by 44% compared with that of 1999 to 13.8 Mt of commercial grade ore. Iron pellet production increased by 140% to 6.641 Mt (Interfax Mining and Metals Report, 2001q). Russia had sharply curtailed imports of iron ore from Kazakhstan, and a resumption of these imports in large quantities from certain of these enterprises, such as the Lisakovskiy mining and beneficiation complex, was unlikely owing to the low iron and high phosphorus content of the ore that did not meet the current demands of Russia's steel industry (Sukhoruchenko, 2000).

Russia.—In 2000, Russia increased production of iron ore by 6.5% in comparison with 1999 to 86.63 Mt. Russia produced 81.04 Mt of iron ore concentrate and 30.76 Mt of iron pellets, which were increases of 8.8% and 4.7%, respectively, in comparison with those of 1999. The increase in output was attributed to a rise in demand from the domestic metallurgical sector (Interfax Mining and Metals Report, 2001ak).

Russia's iron ore production had not suffered as severe a decline as other metal producing sectors, maintaining production at 77% of the 1990 production level and also maintaining product quality. The stabilization of production was attributed to maintaining a constant level of exports of between 11 and 13 Mt/yr along with a sharp decrease in imports to 3 Mt/yr from 16 Mt/yr from other CIS countries. Although production levels were being maintained, a significant shift had occurred in regional levels of production and investment. Iron-ore producing enterprises in the central and northwestern economic regions of the country were producing at levels near or in excess of the 1990 production level, while enterprises in the Urals and Siberia were producing at only 65% and 59%, respectively, of 1990 production levels (Sukhoruchenko, 2000).

These production figures were reflective of investment patterns. This pattern has led to regional deficiencies in supply and increased transportation costs. The iron-ore industry was able to continue to supply metallurgical plants and maintain export levels without difficulty owing to the decrease in domestic pig iron production. Pig iron production and the corresponding demand for iron ore, however, were projected to increase in the 2000 to 2005 period. Problems in maintaining production in the Urals and Siberia were attributed in part to a lack of resolution regarding the ownership of these enterprises (Sukhoruchenko, 2000).

To meet increased demand, a number of variants were proposed, including decreasing exports, increasing imports from Kazakhstan, increasing output at existing domestic enterprises, or developing new mining enterprises, which was considered the least realistic. To increase production at existing enterprises usually would require significant investment owing to worsening mining conditions and a need to upgrade technology and to restructure inefficient production flows. Only about one-half the needed investment funds, however, were available to accomplish these objectives (Sukhoruchenko, 2000).

Ukraine.—Ukraine's total explored iron ore reserves as January 1, 2000, were about 33 Gt, of which about 28 Gt was termed industrial reserves. These reserve categories were based on the Soviet Union's reserve classification system (Prigunov, 2001). Of these reserves, almost 70% was in the Krivyy Rih Basin and is of Lake-Superior-District-type ore (Kornienko, 1999). Rapid development of the iron ore mining industry began in the 1950s in the Krivyy Rih Basin with the commissioning of large mining and beneficiation enterprises. Production peaked in the basin in 1978 with production of 124 Mt of marketable iron ore. Production then began to decline. Since the dissolution of the Soviet Union, iron ore production in Ukraine had fallen by about 50% (Prigunov, 2001).

In 2000, iron ore production was concentrated at seven mining and beneficiation complexes in the Krivyy Rih Basin and at the Poltavskiy mining and beneficiation complex in the Kremenchug iron ore region (Prigunov, 2001). In 2000, Ukraine ranked seventh in the world in iron ore production, with marketable iron ore production increasing by 16.9% compared with that of 1999 to 55.9 Mt (Kirk, 2001; Interfax Mining and Metals Report, 2001ak). The largest iron ore producers in 2000 in the Krivyy Rih Basin were the Inguletskiy mining and beneficiation complex extracting 11,500,700 t of ore; the Yuzhniy mining and beneficiation complex, 8,345,000 t; the Novokrivorozhskiy mining and beneficiation complex, 6,002,400 t; the Severnyy mining and beneficiation complex, 5,974,700 t; the Krivbassruda production association, 5,534,200 t; and the Tsentral'nyy mining and beneficiation complex, 4,030,100 t. In the Kremenchug iron ore region, the Poltaviskiy mining and beneficiation complex extracted 6,509,000 t.

In 2000, iron ore production at the Krivbassruda production association increased by 18.2%; at the Inguletskiy mining and beneficiation association, by 6.6%; at the Novokrivorozhskiy mining and beneficiation complex, by 27.5%; at the Poltavskiy complex, by 31.1%; at the Severnyy mining and beneficiation complex, by 56.8%; at the Tsentral'nyy mining and beneficiation complex, by 9.9%; and at the Yuzhniy mining and beneficiation complex, by 5.5% compared with those of 1999 (Interfax Mining and Metals Report, 2001k).

The majority of open pits were mined at depths of between 250 and 360 m; the majority of underground mines operated at depths below 1,000 m. Mining conditions were worsening with the increasing depth of mines. Problems were becoming greater regarding the volume of overburden removal and transporting materials. Much of the transport equipment was worn out and in need of replacement. It was difficult, even with the introduction of new equipment and technology, to fully compensate for worsening mining conditions (Kovalenko and others, 1998; Prigunov, 2001).

Lead and Zinc

Kazakhstan.—Kazakhstan was the major producer of lead and zinc among the former republics of the Soviet Union and remained the largest producer of these metals among the countries of the FSU. In 2000, Kaztsink increased production to 246,500 t of zinc and 143,600 t of lead, which was respectively 7.5% and 28% more than that of 1999.

Kaztsink was created at the beginning of 1997 with the merger of three major mining and beneficiation complexes and metals plants—the Ust-Kamenogorsk lead-zinc complex, the Leninogorsk polymetallic complex, and the Zyryanovsk lead complex—all of which are located in eastern Kazakhstan. The company also included the Bukhtarma and Tekeli energy complexes and the Tekeli lead-zinc complex. Switzerland's Glencore International AG held the controlling shares of Kaztsink through its subsidiary Kazastur Zinc AG. Kaztsink planned to increase capacity at the Ust-Kamenogorsk zinc plant to 152,100 t/yr and capacity at the Leninogorsk zinc plant to 11,660 t/yr of zinc (Interfax Mining and Metals Report, 2001s).

Production of zinc in concentrate at Kazakhmys decreased to 89,900 t in 2000 from 95,800 t in 1999. Zinc was a byproduct for Kazakhmys. Kazakhmys was building a facility to produce up to 100,000 t/yr of metallic zinc at its Balkhash mining and metallurgical complex, with equipment planned to be installed starting September 2001. The smelter was to meet all environmental standards (Interfax Mining and Metals Report, 2001l).

Russia.—Russia was the second leading producer of lead and zinc in the CIS following Kazakhstan and was the main consumer of these metals in the CIS. During the Soviet era, Russia had been a net importer of both lead and zinc. Consumption of lead and zinc, however, had fallen greatly in Russia since the breakup of the Soviet Union. Domestic mine output and metal production of lead was still less than consumption levels, but zinc consumption had fallen to a degree where mine output and metal production levels were near consumption levels. In 2000, Russia produced 5.7% less lead, including secondary, and 4.2% more zinc compared with those of 1999 (Interfax Mining and Metals Report, 2001an).

The vast majority of Russia's lead was mined in the eastern part of the country, and the vast majority of its zinc was mined in the Urals. The Russian Far East accounted for 62.8% of the country's lead mined and 9.2% of its lead reserves; East Siberia, 17.7% of lead mined and 75.9% of lead reserves; the Urals, 12.6% of lead mined and 1.8% of lead reserves; West Siberia, 4.3% of lead mined and 11.1% of lead reserves; and North Caucasus, 2.4% of lead mined and 2% of lead reserves. The Urals accounted for 86.7% of the country's zinc mined and 26.5% of its reserves; the Russian Far East, 9.2% of zinc mined and 4% of zinc reserves; West Siberia, 2.1% of zinc mined and 10.5% of zinc reserves; and North Caucasus, 1.8% of zinc mined and 2.2% of zinc reserves (Yatskevich, 2000).

In 2000, new zinc smelting projects were announced at Svyatogorsk, Kirovgrad, and Uralelektromed. The Svyatogorsk smelter will produce more refined lead than zinc. A new 200,000 t/yr capacity electrolytic zinc smelter at Chelyabinsk was scheduled to be commissioned in 2001, which will replace an old 146,000 t/yr capacity smelter. The initial capacity of the new smelter will be 155,000 t/yr (CRU International Ltd., 2001).

Uzbekistan.—The Almalyk mining and metallurgical complex produced refined copper, gold, and silver, lead concentrate, metallic zinc, and other products. It had the capacity to mine and process about 25 Mt/yr of ore. In 2000, the Government target for zinc production at Almalyk was 6,300 t of zinc. In 1999, Almalyk produced 27,000 t of zinc (Interfax Mining and Metals Report, 2001bh).

Magnesium

Russia.—Russia produced magnesium at two plants, the Avisma and the Solikamsk magnesium plants, which are both in the Perm region of the Urals. In 2000, Russia's largest magnesium producer Solikamsk Magnesium Works (SMZ) increased production by 2.2% to 17,011 t of magnesium in comparison with that of 1999. SMZ increased production of rare metals by 15% to compensate for a drop in world prices for magnesium. Magnesium and its alloys accounted for 64.4%, and rare-earth and rare-metals production, 34% of SMZ's total output (Interfax Mining and Metals Report, 2001aq). SMZ was owned by the Russian Growth Fund (36%), Sozidaniye (an industrial and investment company) (14%), MINmet Financing Co. (28.88%), SMZ employees (12%), and Leviev Group of Israel (5%) (Interfax Mining and Metals Report, 2001ar).

In 2000, The Avisma titanium and magnesium complex produced 18,500 t of magnesium, which was 9% more compared with that of 1999. By the beginning of 2002, Avisma planned to be able to produce 25,000 t/yr of magnesium owing to the installation of new equipment that would boost capacity. Russia's Verkhnaya Salda Metallurgical Production Association (VSMPO), which was the world's leading producer of milled titanium products, was Avisma's biggest shareholder with 75.18%; SMZ owned 10%, and employees, the rest. In 2001, the VSMPO declared that it intended to buy all of Avisma's shares by yearend (Interfax Mining and Metals Report, 2001e).

Ukraine.—Magni LLC's Potassium and Magnesium Works [owned by Oriana (25%) and ESKO-Pivnich (75%)] at Kalush in Ukraine's Ivano-Frankov region was commissioned in 1969 and has the capacity to produce 17,000 to 18,000 t/yr of magnesium (Interfax Mining and Metals Report, 2001ac).

Manganese

Kazakhstan.—Kazakhstan has 11 identified manganese deposits with a total reserve base of 600 Mt of ore, of which 426 Mt is classified in reserve categories A, B, and C1. According to the Ministry of Energy and Natural Resources, 558.7 Mt are economic reserves. The average manganese content of the economic reserves is 20.5%, which is low grade. High-quality ore, which averages 40% manganese, is in the Kamys and Ushkatyn-III deposits, which together compose 0.2% of reserves (Uzhkenov, 1997).

In 2000, Kazakhstan ranked as the world's eighth largest producer of manganese ore in gross weight and ninth in manganese content of ore (Jones, 2001). Kazakhstan's three manganese mining enterprises were working at less than 50% of their design capacity of 2.55 Mt/yr of crude ore (Uzhkenov, 1997; Jones, 2001). The commissioning of production of ferromanganese and other manganese products, such as dioxide and chemical compounds, increased domestic demand for manganese. Reserves are considered adequate for the 21st century. Plans called for increasing current levels of output to supply domestic ferroalloy producers as well as for export (Uzhkenov, 1997).

Ukraine.—Ukraine contains about 75% of the FSU's manganese reserves (Danil'yants and others, 1999). The balansovy reserves (economic reserves according to the Soviet reserve classification system) of manganese ore in reserve categories A, B, and C1 total about 2.2 Gt. These reserves are in the Nikopol' Basin. Within the basin, the Ordzhonikidze sector (western Nikopol') accounted for 310 Mt; the Marganets sector (east Nikopol'), 280 Mt; and the Bol'shoy Tokmak deposit, 1,582 Mt (U.S. Bureau of Mines, 1994). Three types of ores—oxide, carbonate, and mixed oxide-carbonate—occur. The average grade of the oxide ore is 27.1% manganese; the oxide-carbonate ore, 25.6% manganese; and the carbonate ore, 17% manganese. Since 1975, Ukraine has been mining oxide-carbonate and carbonate ores in addition to the richer oxide ores, which are being depleted. The carbonate ores are more difficult to process and are not as suitable for producing high-grade concentrate (Bundesanstalt fuer Geowissenschaften und Rohstoffe, 1996, p. 47-48; Postolovskiy and others, 2000).

In 2000, Ukraine increased production of manganese concentrate by 38% compared with that of 1999 to 2.74 Mt (Interfax Mining and Metals Report, 2001k). Ukraine was the world's second largest producer of manganese ore by gross weight and manganese content (Jones, 2001; U.S. Geological Survey, unpub. data, 2001). However, Ukraine was producing less than 40% of the peak amount of manganese concentrate it produced in the 1980s. Ukraine had accounted for more than 85% of the manganese produced in the Soviet Union. Since the dissolution of the Soviet Union and the end of Soviet political and economic control in Eastern Europe, the demand for manganese in this region, which was the primary consuming area, had fallen sharply. The country's manganese output was consumed domestically at ferroalloy plants and steel mills, but the output of these domestic industries had also fallen sharply.

In Ukraine, the Ordzhonikidze and the Marganets mining and beneficiation complexes mined their respective sectors of the Nikopol' Basin. Both were public stock companies. At the Ordzhonikidze complex, eight open pit mines supplied ore to three beneficiation plants, and there was also an agglomeration plant. In 2000, Ordzhonikidze produced 1,824,100 t of manganese ore, which was an increase of 29.6% compared with that of 1999 (Interfax Mining and Metals Report, 2001k). Ordzhonikidze had a design capacity to produce 3.92 Mt/yr of manganese concentrate and an actual production capacity of 2.28 Mt/yr of concentrate. Its agglomeration plant had a design capacity and actual production capacity to produce 400,000 t/yr of agglomerate (Postolovskiy and others, 2000).

The Marganets complex had five underground mines, two beneficiation plants, and a chemical beneficiation complex. In 2000, Marganets produced 917,100 t of manganese ore, which was an increase of 58.3% compared with that of 1999 (Interfax Mining and Metals Report, 2001k). Marganets had the capacity to produce between 1.1 and 1.2 Mt/yr of concentrate (Postolovskiy and others, 2000).

Despite some opposition to relinquishing control over the manganese producing enterprises, the Government began selling shares in an effort to greatly increase the charter capital of these enterprises. Plans called for the Ordzhonikidze and Marganets mining and beneficiation complexes to increase their charter capital in 2001 through share offerings intended to finance technical and social development (Interfax Mining and Metals Report, 2001ay, 2001bd).

Mercury

The Khaydarkan mining and metallurgical complex in the Osh region was the major producer of metallic mercury in the FSU. In 2000, it produced about 50% of its raw materials from its own mines, with the remainder coming from Russia and Tajikistan. The Khaydarkan complex mined antimony and fluorspar in addition to mercury. In 2000, it produced 554 t of metallic mercury, which was a decrease of 14% compared with that of 1999. All mercury produced in 2000 was exported to China (Interfax Mining and Metals Report, 2001t; U.S. Geological Survey, unpub. data, 2001).

Natural Gas

Azerbaijan.—In 2000, Azerbaijan's natural gas production decreased slightly to 5.6 billion cubic meters. In 1999, Azerbaijan's natural gas consumption and production were roughly equivalent to 212 billion cubic feet (about 6 billion cubic meters), but the country continued to import natural gas. This situation would change owing to the 1999 discovery of the Shah Deniz field, which was thought to be the world's largest gas discovery since 1978 and was estimated to contain between 25 trillion and 39 trillion cubic feet of natural gas. This field should produce its first gas by 2004, and Azerbaijan could become a significant net gas exporter (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Russia.—Russian experts claimed that Russia had the world's largest natural gas reserves with 33% of the world total reserves (Kozlovskiy and Shchadov, 1999; Malyshev, 2000). The U.S. Department of Energy reports Russia's gas reserves to be more than 48 trillion cubic meters (U.S. Energy Information Administration, October 1998, Country analysis briefs—Russia, accessed April 25, 1999, at URL http://www.eia.doe.gov/emeu/cabs/russia.html). Most production came from reserves in the arctic regions of West Siberia, and in particular from six fields in Tyumen' oblast'—the Urengoi, the Yamburg, the Zapolyarnoye, the Medvezh'ye, the Kharasavey, and the Bovanenko. Combined, these fields had more than three-fourths of the gas reserves in West Siberia. Gasfields in the Orenburg region in the Urals and in the Komi Republic in the European north of the country also provided for significant production (U.S. Central Intelligence Agency, 1985, p. 15).

As of 1999, Russia was the world's largest producer of natural gas (U.S. Energy Information Administration, February 2000, Russia, accessed November 15, 2000, at URL http://www.eia.doe/emeu/cabs/russia.html). Three fields—the Urengoi and the Yamburg in West Siberia and the Orenburg in the Urals—accounted for 80% of the country's natural gas production (U.S. Energy Information Administration, October 1998, Country analysis briefs—Russia, accessed April 25, 1999, at URL http://www.eia.doe.gov/emeu/cabs/russia.html).

Natural gas production was under the control of Gazprom [owned by the Russian Government (38%)] (U.S. Energy Information Administration, February 2000, Country analysis briefs—Russia, accessed November 15, 2000, at URL http://www.eia.doe/emeu/cabs/russia.html). Gazprom controlled more than 95% of Russia's natural gas production as well as its gas pipeline grid and was a major factor in the Russian economy.

In 2000, natural gas production decreased by about 8 billion cubic meters compared with that of 1999 to 584 billion cubic meters. Russian consumers, however, received 344.3 billion cubic meters, which was 6.1 billion cubic meters more than that of 1999 (Interfax Petroleum Report, 2001b). Exports of natural gas outside the CIS increased by 2.1% to 133.8 billion cubic meters (Interfax Statistical Report, 2001e). A total of 60.4 billion cubic meters of gas was pumped into underground storage, which was 7.8 billion cubic meters more than that of 1999 (Interfax Petroleum Report, 2001a).

Natural gas production was declining from peak levels achieved in the early 1990s, but the decline was very gradual. More than 60% of Russia's gas was extracted from deposits with declining output. Growth in reserves was not compensating for the amounts extracted. Depletion rates of reserves at Russia's major gas deposits were between 70% and 80%. In order to maintain production levels, it was considered necessary to develop new deposits in the polar region, on the shelf of the Arctic Sea, near Sakhalin Island, and in other areas posing economic and geographic difficulties. At the same time, it was necessary to construct more than 10,000 km of mainline gas pipelines and the corresponding infrastructure. Given Russia's export commitments and its heavy reliance on the use of gas as a domestic fuel, Russia faced the problem of potential gas shortages. Gas accounted for 62% of Russia's electricity generation (Krasnyaskiy and Shchadov, 2000).

Turkmenistan.—Turkmenistan reportedly contains more than 100 trillion cubic feet (about 3 trillion cubic meters) of proven natural gas reserves. It possesses the world's fifth-largest reserves of natural gas as well as substantial oil resources. Most of the gasfields are in the Amu-Dar'ya Basin, with one-half the country's reserves in the Dauletabad-Donmez field. Turkmenistan also has large gas reserves in the Murgab basin, with the Yashlar deposit reportedly containing 27 trillion cubic feet (about 765 billion cubic meters) of reserves (U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed December 3, 2001, at URL http://www.eia.doe.gov/emu/cabs/turkmen.html).

In 2000, Turkmenistan increased natural gas production to 1.66 trillion cubic feet (about 47 billion cubic meters) from 788 billion cubic feet (about 22.3 billion cubic meters) in 1999. Gas production in Turkmenistan had fallen greatly since the Soviet period because the country was not able to profitably market its gas. Gas from Turkmenistan was being exported to consumers mainly through pipeline routes controlled by Russia. In 1994, the Russian Government refused to allow exported Turkmen gas to pass through Russian pipelines for export to hard currency markets but rather had to be sold to CIS countries.

A number of FSU countries had been receiving gas from Turkmenistan without being able to pay for it. Russia insisted that Turkmenistan continue to supply these countries, but Turkmenistan did not want to supply gas without getting paid. Disputes with Russia's Gazprom, which controlled the pipelines through Russia, resulted in gas shipments from Turkmenistan intermittently stopping, and Turkmenistan reduced its gas production accordingly. Production of gas fell sharply, putting the budget into deficit.

Russia and Turkmenistan were proceeding to resolve this dispute, and in 2000, Russia agreed to purchase almost 10 billion cubic meters of natural gas from Turkmenistan, rising to almost 40 billion cubic meters by 2002 (U.S. Energy Information Administration, July 2000, Country analysis briefs—Turkmenistan, accessed January 25, 2001, at URL http://www.eia.doe.gov/emeu/cabs/turkmen.html). With this Turkmen-Russian agreement on Turkmen gas exports, the country's gas exports more than doubled to 47 billion cubic meters in 2000 from 22.8 billion cubic meters in 1999. Turkmenistan planned to boost gas output to 70 billion cubic meters in 2001, although a pricing dispute with Russia was hindering Turkmenistan from achieving this goal (Interfax Petroleum Report, 2001d; U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed December 3, 2001 at URL http://www.eia.doe.gov/emu/cabs/turkmen.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

Turkmenistan was working to open new gas export corridors through Iran and under the Caspian Sea into Turkey. In 1998, Turkmenistan began exporting gas to northern provinces in Iran via its first pipeline not crossing Russian territory (U.S. Department of State, January 2001, Background note—Turkmenistan, accessed October 29, 2001, at URL http://www.state.gov/r/pa/bgn/2866.htm).

For several years, Turkmenistan had been a key country in the United States-Caspian Basin energy initiative that attempted to facilitate negotiations between commercial partners and the Governments of Azerbaijan, Georgia, Turkey, and Turkmenistan to build a pipeline under the Caspian Sea and export Turkmen gas to the Turkish domestic energy market and beyond via a proposed trans-Caspian gas pipeline. The Government of Turkmenistan, however, essentially removed itself from the negotiations in 2000 by refusing all offers by its commercial partners and demanding multimillion dollar prefinancing (U.S. Department of State, January 2001, ackground note—Turkmenistan, accessed October 29, 2001, at URL http://www.state.gov/r/pa/bgn/2866.htm). Other possible export routes for Turkmen gas include shipping gas to China and Pakistan. A possible pipeline carrying gas from Turkmenistan across Afghanistan to Pakistan had been considered, but construction plans had been suspended owing to the continuing civil war in Afghanistan (U.S. Energy Information Administration, June 2001, Country analysis briefs—Turkmenistan, accessed December 3, 2001, at URL http://www.eia.doe.gov/emu/cabs/turkmen.html).

Uzbekistan.—Uzbekistan was the third largest natural gas producer in the CIS and one of the top 10 gas producing countries in the world. Since becoming independent, Uzbekistan increased its gas production to about 55.6 billion cubic meters in 2000 from 42.8 billion cubic meters in 1992. The country's gas reserves are estimated to be 66.2 trillion cubic feet (almost 1.9 trillion cubic meters), with the richest gas district in the Uzbek section of the Ustyurt region. To offset declining production at some older fields, such as Uchkir and Yangikazen, Uzbekistan was speeding up development at existing fields, such as the Kandym and Garbi fields, as well as planning to explore for new reserves (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/ cabs/caspian.html).

Nickel

In 2000, Russia, which was the world's largest producer of nickel, increased output of refined nickel by 4%. The Russian joint-stock company RAO Noril'sk Nickel, which had metal mines and production facilities in East Siberia and on the Kola Peninsula, produced about 96% of the country's nickel and 20% of the world's output of nickel from mixed sulfide ore. The country's remaining nickel was produced from laterite deposits in the Urals. In 2000, Noril'sk mined 5.6% more ore in comparison with that of 1999, but the grade of nickel in the ore was decreasing. In 2000, Noril'sk mined 4.3% more nickel and produced 4.6% more electrolytic nickel and 48.6% more carbonile nickel compared with that of 1999 (Norilsk Nickel, June 14, 2001, Annual report 2000, accessed July 12, 2001, via URL http://www.nornik.ru/english/press/rep.htm).

Noril'sk's Oktyabr'skiy underground mine was producing about 55% of Noril'sk's nickel mine output in East Siberia. Almost all the remaining mine output of nickel at Noril'sk comes from two other underground mines—the Komsomol'skiy, which produced about 25% of the remaining output, and the Taymyrskiy, about 15% (Piven'and others, 1999).

Nickel production had fallen by almost 40% from the peak levels of the late 1980s. Problems existed with maintaining adequate reserves. The majority of reserves are in areas adjacent to existing producing deposits or at depths below existing reserves (Kozlovskiy and Shchadov, 1999). At the Oktyabr'skiy mine, nickel-rich ores were being depleted. Plans called for production of nickel-rich ores to decrease to 3.4 Mt/yr in 2002 from 4 Mt/yr in 1999, and the production of cuprous ores at Oktyabr'skiy was to increase to 1.6 Mt/yr from 100,000 t/yr during this same period (Piven'and others, 1999). The nickel-rich ores have almost five times as much nickel as do the cuprous ores (Natural Resources Canada, unpub. data, 1999).

Noril'sk was planning to maintain production levels for nickel through the development of two new mines, the Skalisty and the Glubokiy. At Skalisty, some mining had begun in 1997, and the mine was projected to have the capacity to produce 2 Mt/yr of ore. The mine was being developed as a deeper extension of the Oktyabr'skiy mine, and its ores were said to be equal to those of Oktyabr'skiy in nickel content. At the Glubokiy, development had not begun. Its ores were reportedly similar in nickel content to those of the Skalisty mine (Piven' and others, 1996; Sinitsin, 1997, p. 29; Fleming UCB Research, 2000).

Petroleum

Azerbaijan.—Azerbaijan's oil production increased to 14.1 Mt in 2000 compared with 13.8 Mt in 1999 (Interfax Statistical Report, 2001a). Azerbaijan had signed a number of production-sharing agreements with foreign investors to develop both its offshore and onshore deposits. The oil industry accounted for between 70% and 80% of total foreign investment in Azerbaijan. Foreign direct investment increased to $827 million in 1999 from $15 million in 1993, equaling about 20% of Azerbaijan's GDP. Crude oil and oil refinery product exports accounted for more than 70% of Azerbaijan's exports, and oil-related revenue composed nearly 50% of budget revenues.

Most of Azerbaijan's oil was produced offshore in the Caspian Sea. A large percentage of Azerbaijan's oil production was from the Gunashli field, 60 miles (36 km) off the Azeri coast, with a significant percentage coming from the shallow-water section of the Gunashli field. The country's proven oil reserves as well as large undiscovered resources in offshore Caspian fields brought a large number of major international investors to Azerbaijan. Since 1996, more than $3.4 billion had been invested in the country's oil sector, and the President of State Oil Co. of Azerbaijan said that investments in the Azerbaijani oil sector were expected to be between $2 billion and $2.5 billion in 2001.

Azerbaijan had signed 21 joint ventures (JVs) and production-sharing agreements (PSAs) with 33 companies from 15 countries. Not all of these projects had been successful, with several JVs and PSAs shutting down owing in part to projects announcing disappointing drilling results. Restrictions on the ability of JVs to export their oil directly also hampered development at some fields. To increase development, in 2000, Azerbaijan decided to abolish JVs and convert them to PSAs.

Oil production from the country's first PSA, AIOC, began in November 1997. In September 1994, in what was described as the deal of the century, AIOC signed an $8-billion 30-year contract to develop three fields (Azeri, Chirag, and the deepwater portions of Gunashli), with total reserves estimated to be between 3 and 5 Gbbl. Since 1997, almost all of Azerbaijan's production increases have come from AIOC. Azerbaijan's big production surge in the next decade is expected to come from further development of these three fields. AIOC was operated by British Petroleum plc of the United Kingdom. Full-scale development of the AIOC project, however, would depend on a decision regarding export options, including whether oil would be exported via the proposed Baku-Ceyhan pipeline.

In 2000, Azerbaijan's net oil exports totaled 155,000 barrels per day (bbl/d) (about 7.7 Mt). Azerbaijan's only export routes were the Baku-Novorossiisk pipeline (northern route) and the Baku-Sup'sa pipeline (western route), both of which transported Azerbaijan's early oil from AIOC facilities to Black Sea coast ports. Oil products were exported by rail in tank cars to Georgia's Black Sea ports. In September, Azerbaijan attempted to increase its oil exports by switching its power-generating facilities from a fuel oil to gas. Problems with gas supplies during the winter of 2000 to 2001, however, reduced Azerbaijan's oil export potential because fuel oil was needed domestically.

Azerbaijan's options for increasing oil exports depend to a large extent on the construction of new pipelines. Several oil export pipelines from the Caspian Sea region have been under consideration with growing support for the proposed Baku-Ceyhan pipeline, a $2.7-billion 1-Mbbl/d-capacity pipeline that would export Azerbaijani (and perhaps Kazakhstani) oil along a 1,040-mile route from Baku via Georgia to the Turkish Mediterranean port of Ceyhan. Azerbaijan strongly supported the MEP from Baku to Ceyhan, but Iran, Russia, and Ukraine, among others, were proposing alternative oil export routes for Azerbaijan (U.S. Energy Information Administration, May 2001, Country analysis briefs—Azerbaijan, accessed October 31, 2001, at URL http://www.eia.doe.gov/cabs/azerbjan.html).

Kazakhstan.—Kazakhstan was developing its oil resources with the participation of international companies. This participation has taken the form of JVs, PSAs, and exploration/field concessions. In 2000, Kazakhstan's oil production increased to 35.3 Mt compared with 30.1 Mt in 1999 (Interfax Statistical Report, 2001a). Almost one-half of its output came from three large onshore fields (Tengiz, Uzen, and Karachaganak). In addition, preliminary drilling in Kazakhstan's offshore sector of the Caspian Sea resulted in what appeared to be a giant find at the Kashagan field and raised the possibility that Kazakhstan could become one of the world's largest oil producers (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/caspian.html).

In 1993, Chevron Corp. concluded a joint venture in Kazakhstan to create the Tengizchevroil company to develop the Tengiz oilfield, which was estimated to contain recoverable oil reserves of between 6 and 9 Gbbl (about 800 Mt to 1.2 Gt). Tengizchevroil produced about 9.4 Mt (190,000 bbl/d) in 1999 and 10.4 Mt in 2000. Production was planned to increase to 12 Mt in 2001 (Interfax Petroleum Report, 2001c). Because of the commissioning of the Caspian Pipeline Consortium's Tengiz-Novorosiisk export pipeline, it was possible to increase production. Additional export pipelines would be needed. With adequate transit capabilities to export, the Tengizchevroil joint venture could reach peak production of 750,000 bbl/d (more than 37 Mt/yr) by 2010 (U.S. Energy Information Administration, August 2000, World energy areas to watch, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/cabs/hot.html; U.S. Energy Information Administration, July 2001, Caspian Sea region, accessed August 3, 2001, at URL http://www.eia.doe.gov/emeu/ cabs/caspian.html).

Russia.—In 2000, Russia was the world's third largest producer of crude oil and ranked among the world's leaders in oil exports and reserves (Sagers, 2001). Crude oil production in

Russia increased by about 7% in comparison with that of 1999 to 325 Mt. Russian exports of crude oil and petroleum products to countries outside the CIS increased by 9.9% and 8.4%, respectively, to 127.6 Mt and 59.4 Mt (Interfax Statistical Report, 2001e). The major Russian oil companies had a profitable year owing to higher oil prices on the world market, and the industry was able to invest in production development (Interfax Petroleum Report, 2001b). In 2000, Russian oil refineries refined 174.5 Mt of crude oil, which was 5.7 Mt more than that of 1999, and produced more gasoline and diesel fuel.

In 1993, Russia began a program, designed in two phases, to privatize the oil sector. The first phase involved establishing several large vertically owned joint-stock companies (VIC), and the second phase, which was ongoing as of yearend 2000, involved auctioning off large shares of stocks in these companies. The Russian oil sector included 11 large VICs, which accounted for almost 90% of total national crude oil production and almost 80% of refinery throughput. These 11 major VICs ranked by level of crude oil production in 2000 were OAO Lukoil, Yukos Oil Co., JSC Surgutneftegaz, Tyumen' Oil Co., JSC Tatneft, JSC Sibneft, Rosneft Oil Co., Slavneft Oil and Gas JSC, Bashneft Oil Co., OAO Sidanco, and Onanko (Sagers 2001; U.S. International Energy Administration, December 2000, Country analysis briefs—Russia, accessed August 2, 2001, at URL http://www.eia.doe.gov/emeu/cabs/russia.html). In 2000, 132 enterprises were producing oil in Russia, but the majority was small and producing less than 1 Mt/yr (Sagers, 2001).

Tyumen' oblast' in West Siberia, a mature oil producing region where production levels had reached a plateau, accounted for about two-thirds of national production. The Volga and Urals regions, also mature regions, were the next two largest producing regions, but each produced only about 20% of the amount produced in Tyumen. Russia's level of oil production in the future would depend on how long the country could maintain the current level of output in West Siberia until new reserves are put into production in areas that include East Siberia, the Timan-Pechora and Sakhalin regions, and the Russian sector of the Caspian Sea (Sagers, 2001).

Phosphate Rock

The majority of the country's phosphate reserves was in the form of apatite ore on the Kola Peninsula that averaged about 14% phosphorous pentoxide (P_2O_5) (Kozlovskiy, 1984; Gabrielyants and others, 1991, p. 69). Phosphate rock also was produced at a number of sedimentary deposits that contain lower grade phosphate rock; more than 250 small phosphate rock deposits were deemed to be potentially useful for producing phosphate flour for local agricultural use (Timchenko, 2000).

The Apatit Production Association on the Kola Peninsula was the country's major source of phosphate raw material in the form of apatite concentrate. Apatite was also mined with iron ore at the Kovdor deposit on the Kola Peninsula and from the Kingisepp mining and beneficiation complex in Leningradskaya oblast'. Enterprises that developed the Bryansk and the Verkhnekamsk sedimentary ore deposits had the capacity to produce phosphate rock that yields about 700,000 t/yr of P_2O_5, which was used in the production of phosphate flour. In addition, phosphate rock production from the Vyatskoye-Kamskoye deposit was used in the production of yellow phosphorous. Owing to the inability of domestic farmers to pay for fertilizer, the production of phosphate fertilizer materials from nonapatite sources had been sharply curtailed (Timchenko 2000).

The Kola Peninsula produced more than 90% of the country's phosphate output. All phosphate raw material exports from Russia were of apatite concentrate from the Kola Peninsula. In 2000, the Apatit Production Association was in its 71st year of existence and remained one of the world's major producers of phosphate raw material in the form of apatite concentrate; it also produced nepheline syenite, which is used as a raw material for aluminum production. The association consisted of four mining enterprises, an apatite-nepheline beneficiation complex consisting of two plants, and auxiliary facilities. Its holdings extend 70 km from west to east and 30 km from north to south. Its products were shipped domestically throughout the country by rail and exported through the ports of Murmansk and Kandalaksha. The association has 11 explored deposits of apatite-nepheline ore, with total ore reserves of more than 3.6 Gt. Of the explored deposits, six were under development by two open pit and two underground mining enterprises.

The problems confronting Apatit were the decreasing quality of the ore and more complicated mining and hydrological conditions owing to the increasing depth of the mines. The percentage of ore mined by open pit methods was projected to decrease to 55% in 2005 and to 30% by 2015 from 65% in 2000. Production at Apatit had stabilized after going through a period of severe decline in the 1990s, with production reviving in the past 3 years. Plans called for maintaining apatite concentrate production in a range from 9 to 9.5 Mt/yr, which would require attracting investment to maintain existing production capacities and to prepare new horizons for underground mining (Fedorov, 2000; Timchenko, 2000).

Apatit was producing two brands of concentrate—the standard, with a P_2O_5 content of not less than 39%, and a super brand, with a P_2O_5 content of not less than 40%. Up to 59% of total output was consumed domestically, 11% was exported to other CIS countries, 9% was exported to the Baltic States, and the remaining 21% was exported to other countries of the world (Fedorov, 2000).

Platinum-Group Metals

In 2000, Russia was the world's second largest producer of platinum-group metals (PGMs) after South Africa but the world's largest palladium producer because there is a higher ratio of palladium to platinum in Russian ores than in South African ores (U.S. Geological Survey, unpub. data, 2001). Noril'sk Nickel mined more than 95% of the country's PGM output from mixed sulfide ores at its deposits in East Siberia. In 2000, Noril'sk mined 5.6% more ore in comparison with that of 1999, and the PGM content in the ore mined increased. In 2000, Noril'sk increased PGM production by 10% compared with that of 1999 (Interfax Mining and Metals Report, 2001ad).

Despite an expected decrease in the mining of nickel-rich ores at the Oktyabr'skiy mine, Noril'sk's mine output of PGMs was projected to increase. The Oktyabr'skiy mine produced almost 60% of the country's PGM output. Although plans called for production of nickel-rich ores at Oktyabr'skiy to decrease to 3.4 Mt/yr in 2002 from 4 Mt/yr in 1999, the production of cuprous ores at Oktyabr'skiy was to increase to 1.6 Mt/yr from 100,000 t/yr during the same period (Piven' and others, 1999). The cuprous ores have almost as much PGMs as do the nickel-rich ores (9.8 g/t versus 10.8 g/t) (Bond and Levine, 2001). The increase in cuprous ore production would increase PGM production levels, and a further increase in PGM production would be derived from increasing production of low-sulfide disseminated ores at the Medvezhiy Ruchey open pit and the Zapolyarnyy underground mines. These low-sulfide disseminated ores, which are lower in copper and nickel content than other ore types at Noril'sk, have a PGM content (9 g/t) almost equal to that of the cuprous and nickel-rich ores (Bond and Levine, 2001). In addition, plans called for the development of two new mines—the Glubokiy and the Skalisty—with nickel-rich ores that had a high PGM content. The Skalisty mine began operations in 1997, and plans called for it to reach capacity production of 2 Mt/yr by late 2001 or 2002. At the Glubokiy mine, development had not begun and it would take approximately 5 years thereafter to commence production (Piven' and others, 1996; Sinitsin, 1997, p. 29; Fleming UCB Research, 2000).

At the Komsomol'skiy and the Mayak mines, the two oldest underground mines of Noril'sk, output had been decreasing and had shifted to mining primarily cuprous ores. Plans originally called for extraction at these two mines to cease by 2003. Based on a new technological assessment, however, plans called for the Komsomol'skiy mine to continue mining cuprous ores and also, in part, to begin mining disseminated ores. In part, these two oldest mines were to be financially revived through a reorganization that linked them with the new Skalisty mine that was being developed to mine nickel-rich ore. In 1998, the separate status of these three mines was eliminated, and they were merged into the Komsomol'skiy mining enterprise, which included the Komsomol'skiy, the Mayak, and the Skalisty mines. Financial projections for the Komsomol'skiy mining enterprise for the period from 2000 to 2010 showed a more than sixfold increase in the value of output from the Skalisty mine, a 20% increase in the value of output from the Komsomol'skiy mine, and the value of output from the Mayak mine remaining at about its 2000 level (Kozhiyev and Sabanov, 2001). The Komsomol'skiy mining enterprise employed 2,150 workers. At the time of the merger, the three mines employed 2,700 workers (Abramenko, 2001). Thus, if production took place according to the plan, then the level of copper, nickel, and PGM output would increase slightly at these two older mines and significantly at the Skalistiy mine by 2010.

PGM output also will increase owing to a plan to process tailings with a high PGM content at the Noril'sk concentrator starting in 2001. Foreign firms were being solicited to provide new technology to process these tailings. The tailings, which accumulated at the Noril'sk concentrator over the course of decades, reportedly have an average PGM content of 8 g/t and contain about 600 t of PGM (Bond and Levine, 2001).

In the Murmansk region on the Kola Peninsula, PGM reserves reportedly totaled 1,040 t in the Pana tundra intrusion. This would make the site comparable in quantity of reserves to that of the Stillwater deposit in the United States. Murmansk geologists were to devote their efforts in 2001 to assessing the possibility of putting the eastern Pana section into commercial production.

According to the Russian Academy of Sciences, the Pana intrusion is a series of shallow seams containing PGM metals. Geologists discovered seven seams extending more than 10 km in length. Two seams, the upper and lower seams, reportedly have gradings up to 50 g/t platinum and palladium. The average PGM gradings are reportedly 17.4 g/t (Interfax Mining and Metals Report, 2001z).

Potash

Belarus.—In 2000, Belarus was the world's second largest producer of potash after Canada (U.S. Geological Survey, unpub. data, 2001). In the 1980s, Belarus was producing more than 5 Mt/yr, calculated based on potassium oxide (K_2O) content, but following the breakup of the Soviet Union, production had fallen to 1,946,700 t K_2O by 1993. A program was then undertaken to raise the quality of potash to world standards to increase exports to world markets. In 2000, production was almost 3.8 Mt K_2O, which was a decrease compared with the more than 4.5 Mt K_2O production in 1999.

Potash mining was conducted by the Belaruskaliy production association, which operated the Soligorsk mining complex located in Minskaya voblasts. Soligorsk was developing additional mining capacity intended to compensate for depleting reserves and to lower mining costs (Louis, 2001).

In 2000, Belarus exported more than 80% of its potash output, with most exports going to consumers in the CIS. Belarus itself was the second largest consumer of potash in the CIS, after Russia.

Russia.—In 2000, Russia was the world's third largest potash producer (U.S. Geological Survey, unpub. data, 2001). Russian reserves were reported to be about 1.8 Gt K_2O (Searls, 2001). All potash production was from the Verkhne Kamsk deposit in the Urals, which contained about 96% of the country's reserves (Timchenko, 2000). Production came from two enterprises, the Silvinit and the Uralkaliy, which mined the Verkhne Kamsk deposit. Verkhne Kamsk sylvinite ore is hosted by a large halite zone with carnallite zones and sylvinite zones (Troitsky and others, 1999, p. 101).

The country was estimated to have the production capacity potentially to produce 6.3 Mt K_2O (Russian Mining, 2000). The Silvinit enterprise had increased its capacity by 100,000 t/yr K_2O, and no change in capacity occurred at JSC Uralkaly (Louis, 2001).

Growth in production was based on growth of exports because domestic demand remained quite low. The goal of increasing exports was being facilitated by improvements at Latvia's Baltic Sea port facilities at Riga and Ventspils and in the Black Sea facilities at Illichivs'k in Ukraine, which were the major shipping ports for Russian potash (Louis, 1998).

Tin

The Novosibirsk tin smelting complex, Russia's biggest tin producer, produced 5,200 t of tin in 2000, which was a 36% increase in production compared with that of 1999. In 2001, Novosibirsk planned to increase revenues by increasing output for a series of new products, including pure lead and bismuth. A new division for these was started in late 2000, and by the beginning of 2001, Novosibirsk had produced 308 t of pure lead and 15 t of pure bismuth, with production slated to increase in 2001 by 207% and 200% respectively. Novosibirsk planned to buy 85% of its concentrates from tin mines it owned by 2002. In 1999, Novosibirsk acquired 52% of the shares in Dalolovo (established to develop the Solnechnyy deposit in Primor'ye); 50%, in Tianshanolovo (Kyrgyzstan); and 51%, of Khinganskoye olovo (Jewish Autonomous District). It also owned 15% of Deputatskolovo (Yakutiya) and was trustee of the state-owned 11% of this company for 3 years.

In 2001, Novosibirsk planned to buy 2,750 t of tin concentrate from Deputatskolovo, which would be 7.8% more compared with that of 2000. Deputatskolovo increased concentrate production owing to an investment program that provided $5 million to $6 million. Commercial mining at Tianshanolovo was to begin in 2001, and Novosibirsk planned to deliver 350 to 400 t of concentrate from this mine in 2001. Novosibirsk also expected to buy 350 t of concentrate from Dalolovo in 2001. Novosibirsk had invested $1 million to rehabilitate Dalolovo, buying bulldozers, excavators, loaders, and other machinery. Dalolovo was set up to develop the Solnechnoye tin deposit, which the Solnechnyy mining and beneficiation complex had developed. Dalolovo's main owners were Novosibirsk (52%) and Solnechnyy and the Khabarovsk territorial administration (7.17%).

Novosibirsk's owners included Russia's Sibirskaya Mnogoprofilnaya Kompaniya, FTK SibElfin, and ED-SIB-A, which owned 18%, 15%, and 14% of the shares, respectively. Other holders included Depositary and Clearing Center and ZAO CS First Boston (Interfax Mining and Metals Report, 2001ae).

Titanium

Kazakhstan.—The Ust'-Kamenogorsk titanium and magnesium complex in Oskemen (formerly Ust'-Kamenogorsk) was the country's sole producer of titanium sponge and magnesium. In 2000, titanium sponge production decreased slightly compared with 1999 to 8,280 t (Interfax Mining and Metals Report, 2001r).

The Ust'-Kamenogorsk titanium and magnesium complex was commissioned in 1965 and restructured in 1993 as a joint-stock company. It is located in northeastern Kazakhstan where many of the country's major metallurgical enterprises are based. The enterprise employed nearly 4,000 people and specialized in the production of titanium sponge and magnesium.

The enterprise had received international certification for its titanium sponge. In 1999, the Ust'-Kamenogorsk plant received ISO 9002 certification for its titanium sponge. It had its own quality-control system operated in conjunction with some of the world's leading aerospace companies. The enterprise produced and sold under prepaid contracts. The company's main titanium sponge consumers were Specialty Metals Co. S.A. of Belgium (a key shareholder in the company) and Chori Co. Ltd. of Japan. It also sold sponge to other companies in Europe, Japan, and the United States. Specialty Metals held 65.67% of the enterprise's shares and the Kazakhstani Government held 15.5%. The Government planned to sell part of the 15.5% of its state-held shares in 2001. TMP Ltd. of the United Kingdom performed most trade activity for the company.

The enterprise had used imported raw materials since it was opened but was developing its own raw material base for titanium. In 2000, Ust'-Kamenogorsk created Satpayevsk Titanium Mining Ltd. for this purpose. The Ferrokhrom enterprise (part of Kazkhrom Group) owned the Shokash titanium field, which had 17 Mt of reserves, and planned to produce 100,000 t/yr of concentrate there. This would enable Ferrokhrom to produce titanium slag for use by Ust'-Kamenogorsk.

Ust'-Kamenogorsk ended 2000 with a net profit despite a drop in production and sales from 1999 (Moscow Interfax in English, October 15, 2001, Ust'-Kamenogorsk plant fully recovers from 1999 crisis in first half, accessed October 24, 2001, via URL http://fbis.fedworld.gov). In 2000, the Ust'-Kamenogorsk complex had almost completely overcome the consequences of the 1999 crisis when titanium prices plunged. In 1999, the enterprise produced about 27% less titanium compared with that of 1998 as consumers backed out of contracts due to a drop in production in the industries that used titanium products and a resulting increase in supply over demand. The company increased magnesium production to help offset the drop in sales of titanium (Moscow Interfax in English, October 15, 2001, Ust-Kamenogorsk titanium magnesium combine, accessed October 24, 2001, via URL http://fbis.fedworld.gov).

Russia.—In 2000, production of titanium sponge increased by about 25% at the Avisma titanium-magnesium plant in the Perm region of the Urals. Avisma was the country's only major titanium sponge producer. Plans called for titanium sponge production to increase by 16% in 2001 compared with that of 2000 owing to increased sales to the VSMPO, which was the world's leading producer of milled titanium products and Avisma's biggest customer (Interfax Mining and Metals Report, 2001e).

In 2000, titanium accounted for 80.1% of the VSMPO's output; aluminum, 10.7%; ferrotitanium, 5.6%; and steel, 3.1%. Such products as bars, tiles, and sheets accounted for 80% of sales. The VSMPO sold 65% to 70% of its output under long-term contracts with major companies, such as Boeing Co., Airbus Co., General Electric Aircraft Engines, and Rolls-Royce plc. The VSMPO planned to increase sales by 53% to 12,000 t in 2001 compared with those of 2000. The VSMPO's titanium exports rose by 27% to 7,860 t and by 12% in value in 2000 compared with those of 1999. The VSMPO also planned to increase milled titanium supplied to Boeing to between 530 and 590 t in 2001. The establishment at the end of 2000 of the VSMPO's U.S. operations, a production center in Los Angeles, would help increase sales. The VSMPO intended to open another center in February 2001 on the U.S. eastern seaboard where some of the major aircraft manufacturers had suppliers. The new centers were building up buffer stocks of the VSMPO products. Urgent orders were coming in as titanium prices climbed. The VSMPO took 45 days to ship its metal from Russia, but with the production centers, it could deliver in a more timely manner to its customers (Interfax Mining and Metals Report, 2001ap, bh).

About 38% of shares in the VSMPO was owned by Verkhnaya Salda Union, about 12% was owned by company employees, and about 40% was held by nominal shareholders CS First Boston and Depositary and Clearing Center (Moscow). The other 10% were held by small shareholders in stakes of less than 1%.

Ukraine.—The Zaporozh'ye titanium-magnesium complex in Ukraine had the capacity to produce 20,000 t/yr of titanium sponge during the Soviet era. Ukraine's Government was trying to reorganize the complex and was seeking investors for joint ventures to upgrade the complex and promote its products for export (Interfax Mining and Metals Report, 2001aw). In the late 1990s, production had ceased and then resumed. The plant, however, was producing far less than it did in the Soviet era.

Uranium

Kazakhstan.—Kazakhstan's national nuclear company Kazatomprom produced 1,740 t of uranium in 2000, and planned to produce about the same amount in 2001. It supplied uranium under long-term contracts to Belgium, Japan, and the United States. Kazatomprom was the country's sole producer, exporter, and importer of uranium. It controlled the geological prospecting outfit Volkovgeologiya (90% share); the Ul'ba metallurgical plant, which produced beryllium and tantalum metal (90% share); and the Central, Stepnoye, and No. 6 mines. These mines are located in the Suzak District of southern Kazakhstan, where 48% of the country's uranium reserves are located (Interfax Mining and Metals Report, 2001n).

In the 1980s, as a part of the Soviet Union, Kazakhstan was producing between 4,500 and 5,000 t/yr of natural uranium. All mining methods—open pit, conventional, and in situ leaching (ISL)—during this period were used at 12 mines, which formed 4 major complexes. Uranium reserves reportedly were estimated to be 900,000 t, of which 600,000 t could be mined by ISL methods. Starting in the mid-1990s, all uranium was mined in Kazakhstan using ISL methods.

In 2000, five deposits were under development—Uvanas, Eastern Mynkuduk, Kanzhugan, and Northern and Southern Kara-Murun. Remaining in situ reserves in these deposits are reportedly about 80,000 t. Kazatomprom was participating in two joint ventures with Cameco Corp. and Cogema Group at the Inkai and Moyun-Kum deposits, respectively. These deposits reportedly contain 200,000 t of confirmed uranium reserves. Joint-venture development of the Inkai and Moynkum deposits was limited to test mining. Owing to unfavorable market conditions, operations at the Inkai deposit and the central part of the Mynkuduk deposit were suspended.

A joint venture that included Kazatomprom, Russia's Ministry of Atomic Energy, and Kyrgyzstan's Kara Balta mining complex was formed to start mining the Zarechnoye uranium deposit in Kazakhstan by yearend 2001. The joint venture was projected to produce about 500 t/yr of uranium concentrate in the next few years. Zarechnoye was explored during the Soviet era, and experimental mining took place, but the deposit was not commissioned. The deposit reportedly contains proven reserves of 14,500 t and probable resources of 4,500 t of uranium.

Kyrgyzstan.—Uranium mining ceased in Kyrgyzstan in the mid-1980s. The Kara Balta mining and processing enterprise in Kyrgyzstan was still one of the FSU's largest uranium processing plants. It was controlled by Kyrgyzstan's Defense Ministry. It produced yellowcake from concentrates from Kazakhstan. It was engaged in a joint venture with Kazakhstan and Russia to produce yellowcake for Russia from the Zarechnoye deposit in Kazakhstan.

Russia.—The Streltsovskiy uranium ore district in Russia includes more than 10 uranium deposits suitable for open pit and underground mining. The Priargunskiy mining complex developed these deposits for many years and had mined in total about 100,000 t of uranium. Estimated remaining uranium reserves total 170,000 t with an average ore grade of 0.18% uranium. In 2000, Priargunskiy mined five deposits by underground methods with output for the year 2000 reaching about 2,500 t uranium. Priargunskiy did not plan to increase production.

Russia did not produce enough uranium to meet its consumption requirements. It consumed between 5,000 and 6,000 t/yr of uranium and was relying on stockpiles. Russia planned to increase the capacity of its nuclear reactors by 50% by 2010 and by more than 450% by 2050. Russia's uranium shortfall could reach about 10,000 t/yr by 2010. Because its stockpiles would be depleted in the coming years, Russia was planning to make up for shortfalls by participating in uranium development projects at home and abroad (Dzhakizhev, 2001; Interfax Mining and Metals Report, 2001am).

Tajikistan.—Uranium mining ceased in Tajikistan in the mid-1980s.

Ukraine.—All deposits in Ukraine are low grade. The Vostochnyy mining and processing enterprise had been mining and processing ores from the Vatutin, Michurin, and Central deposits for many years. This ore contains 0.1% or less uranium and was mined from deep shafts. In 2000, production was 600 t and was expected to gradually decrease in quantity. According to forecasts, Ukraine would most likely cease uranium mining by the year 2010 (Dzhakishev, 2001).

Uzbekistan.—Total uranium reserves in Uzbekistan reportedly are about 185,000 t, of which approximately 114,000 t can be developed by ISL methods. Uzbekistan also reportedly has resources of about 240,000 t that have not been completely delineated, of which 190,000 t are regarded as the sandstone type. The State Committee for Geology and Mineral Resources listed 27 uranium deposits, most of which are in the Kyzyl Kum Desert, reportedly containing proven reserves of 55,000 t of uranium (Interfax Mining and Metals Report, 2001aa).

Since 1995, mining was no longer conducted by open pit and conventional methods. In 2000, the deposits under development—Ailendy, Beshkak, Ketmenchi, Sabyrsay, South and North Bukinay, Syrgali, and Uchkuduk—were being mined by ISL methods. Resources of these deposits constitute approximately 30% of total sandstone deposits (Dzhakishev, 2001).

Mining was conducted primarily by the Navoiy mining and metallurgical complex, the country's largest gold and uranium producer. In the mid-1980s, during the Soviet period, Navoiy used to produce 3,000 to 3,500 t/yr of low-enriched uranium. By the mid-1990s, Navoiy was producing less than 1,500 t/yr. In recent years, production had increased. In 1999, Navoiy produced more than 2,100 t of uranium, which was about 8% more than it produced in 1998 and about 5% more than it produced in 2000. All production was exported (Dzhakishev, 2001; Interfax Mining and Metals Report, 2001aa, ab).

Navoiy planned to preserve existing capacity and to create additional capacity to mine uranium. Navoiy planned to produce 2,300 t in 2001. In 2000, Navoiy started to mine the major Syrgaly uranium deposit in central Kyzyl Kum. The deposit was slated to produce its first 100 t of uranium in 2001. Ore mined by Navoiy was processed at the No. 1 hydrometallurgical plant in Navoiy. In recent years, Navoiy invested more than $10 million in its uranium mining capacity, buying new drilling rigs and submersible pumps among other equipment (Interfax Mining and Metals Report, 2001aa).

Zirconium

Russia.—The Kovdor mining and beneficiation complex, which is a producer of apatite, baddeleyite, and iron ore concentrates from the Murmansk region, planned to produce 6,000 t of baddeyeyite concentrates in 2001. Kovdor was Russia's only domestic producer of zirconium raw materials.

Kovdor's owners were the (Russian) property fund (24.8%), the Murmansk regional government (21.13%), the Tavricheskiy commercial bank (more than 10%), the Severstal steel works (Kovdor's biggest consumer) (4.8%), and MDM Group (36%) (Interfax Mining and Metals Report, 2001u).

Ukraine.—The Vol'nogorsk State mining and metallurgical complex produced zirconium and rutile concentrates from Ukraine's Dnepropetrovsk region. It was the only producer of zirconium ore in the FSU. In 2000, Vol'nogorsk exported about 75% of its output, 20% of which went to the CIS and the rest to Bulgaria, Germany, Italy, Poland, Romania, the United States, and other countries. The complex, established in 1961, specialized in mining and processing titanium-zirconium ores and was on a list of enterprises not to be privatized (Interfax Mining and Metals Report, 2001bc).

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TABLE 1
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 p/
ARMENIA					
Metals:					
Copper:					
Concentrate, Cu content e/	9,100 r/	9,000 r/	9,200 r/	9,600 r/	14,000
Blister	--	5,000	3,000	5,000 e/	7,231 3/
Gold e/ kilograms	244 3/	500	350 r/	400 r/	400
Molybdenum, concentrate, Mo content	1,800	1,800 e/	2,500 e/	5,403 r/	6,044
Silver kilograms	626	1,000	1,000	1,200 e/	1,300
Zinc, concentrate, Zn content	820 e/	830 e/	825 e/	879 r/	528 3/
Industrial minerals:					
Cement thousand tons	282	297	300 r/	287	219 3/
Clays, bentonite (powder)	2,750	2,750 e/	3,000 e/	3,493 r/	2,807 3/
Limestone thousand tons	1,800	1,700	1,700	1,700 e/	1,700
Perlite e/	6,000	6,000	35,000	35,000	35,000
Salt	26,400	26,000 e/	24,911	26,955	30,000 3/
AZERBAIJAN 4/					
Metals:					
Aluminum:					
Alumina	1,000 r/	12,900	6,600	76,100 r/	200,000
Aluminum, primary	800 r/	4,800 r/	3,386 r/	1,278 r/	2
Alunite	100,000 e/	50,000	--	--	NA
Iron ore, marketable	3,900 r/	2,200	6,600	-- r/	--
Steel:					
Crude	24,607 r/	24,600 r/	24,000 r/ e/	24,500 r/ e/	25,000
Rolled	2,000	20,000	3,000	NA	NA
Pipes	3,100	13,000	3,100	100 r/	NA
Ingots and castings	NA	NA	8,292	381	846 3/
Industrial minerals:					
Caustic soda	33,200 r/	23,400 r/	21,000 r/	20,800 r/	30,000
Cement	223,000	314,800	201,000	171,400 r/	200,000
Iodine e/ kilograms	300,000 r/	300,000 r/	300,000 r/	300,000 r/	300,000
Gypsum e/	55,000 r/	60,000 r/	60,000 r/	60,000 r/	60,000
Mineral fertilizers	1,900 r/	5,700 r/	600 r/	40 r/	NA
Salt	2,500 e/	2,500 e/	3,518 r/	2,978 r/	3,801 3/
Sulfuric acid	31,000	52,500	24,000 r/	24,000 r/	24,000
Mineral fuels and related materials:					
Natural gas thousand cubic meters	6,304,000	5,963,900	5,590,000	6,000,000	5,600,000 3/
Natural gas plant liquids 42-gallon barrels	2,190,000	2,555,000	2,555,000	2,555,000	2,560,000 3/
Petroleum, crude	9,100,300	9,027,000	11,420,000	13,800,000	14,100,000 3/
BELARUS					
Metals, steel:					
Crude thousand tons	886	1,220	1,412	1,449 r/	1,623 3/
Rolled do.	770 r/	1,072 r/	1,250 r/	1,300	1,400 3/
Pipes	18,900 r/	30,700 r/	47,200 r/	50,000 r/ e/	55,000
Industrial minerals:					
Cement thousand tons	1,467	1,876	2,035	1,998 r/	1,847 3/
Nitrogen, N content of ammonia do.	678 r/	590	685	765 r/	730
Potash, K_2O equivalent do.	2,716 r/	3,247	3,451 r/	4,553 r/	3,786 3/
Salt 5/	230,500 r/	297,100 r/	355,200 r/	344,318 r/	310,741 3/
Sulfur e/	25,000	20,000	20,000	20,000	20,000
Sulfuric acid thousand tons	549	698	640 r/	650 r/ e/	650
Mineral fuels and related materials:					
Natural gas million cubic meters	249	246	252	256 r/	257 3/
Peat:					
Horticultural use	533,000	253,000	99,000	100,000	100,000
Fuel use	2,847,000 r/	2,768,000	2,035,000	3,090,000 r/	2,023,000 3/
Total	3,380,000	3,021,000	2,134,000	3,190,000	2,123,000
Petroleum:					
Crude thousand tons	1,860	1,822	1,830	1,840 r/	1,841 3/
Refined do.	12,400	11,900 r/	12,000 e/ r/	12,000 e/ r/	12,000

See footnotes at end of table.

TABLE 1--Continued

COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
GEORGIA						
Metals:						
Copper, mine output, Cu content		5,100	4,100	6,000 e/	7,200	8,000
Gold	kilograms	500 e/	700 r/ e/	700 r/ e/	2,043 r/	2,924 3/
Iron and steel:						
Ferroalloys, electric furnace: e/						
Ferromanganese		7,600	4,000	10,000	11,297 3/	6,670 3/
Silicomanganese		7,000	16,600	35,000	26,249 3/	20,458 3/
Total		14,600	20,600	45,000	37,546 3/	27,128 3/
Steel:						
Crude		84,870	104,242	50,000 e/	NA r/	49,500 3/
Finished products, rolled		60,000	100,000	40,000	10,000	1,000 3/
Lead, mine e/		200	200	200	200	200
Manganese ore, marketable		50,000 r/ e/	30,000 r/ e/	50,000 e/	47,900 r/	59,100 3/
Silver	kilograms	NA	NA	NA	29,487	33,884 3/
Industrial minerals:						
Barite e/		20,000	20,000	20,000	15,000	15,000
Cement		84,700	90,600	200,000	342,200 r/	347,700 3/
Clays, bentonite		13,000	12,000 r/	11,000 r/ e/	9,891 r/	7,084 3/
Zeolites		7,300	6,000	NA	NA	NA
Mineral fuels and related materials:						
Coal		6,100	4,200	14,700	12,000 r/	7,000 3/
Natural gas	thousand cubic meters	3,000	--	--	--	100,000 3/
Petroleum:						
Crude		127,000	143,000	119,200	91,300 r/	109,500 3/
Refined		NA	NA	NA	56,500	24,500
KAZAKHSTAN						
Metals:						
Aluminum:						
Alumina	thousand tons	1,083	1,095	1,085	1,158 r/	1,217 3/
Bauxite		3,345,900 r/	3,416,000 r/	3,436,800	3,606,500	3,729,600 3/
Arsenic trioxide e/		1,500	1,500	1,500	1,500	1,500
Beryllium, metal		100 e/	100 e/	100 r/ e/	220 r/	431 3/
Bismuth, metal e/		50	50	50	55	55
Cadmium, metal		567 r/	745 r/	1,622 r/	1,246 r/	257 3/
Chromite		1,190,000	1,798,300	1,602,700	2,405,600 r/	2,606,600 3/
Cobalt, mine output, Co content e/		300	300	300	300	300
Copper:						
Mine output, Cu content		250,100 r/	316,166	338,600 r/	373,500 r/	430,200 3/
Metal:						
Smelter, undifferentiated		245,000	315,960	350,000 e/	383,457 r/	413,859 3/
Refined, primary		267,100	301,000	324,900	361,890 r/	394,723 3/
Gold:						
Mine output, Cu content	kilograms	12,500 e/	18,700 e/	18,100 r/ e/	20,236 r/	28,171 3/
Metal, refined	do.	9,000 e/	9,700 e/	8,900	9,655 r/	11,529 3/
Iron and steel:						
Iron ore, marketable		13,000,000 r/	13,132,600 r/	8,692,900 r/	9,616,700 r/	13,828,500 3/
Metal:						
Pig iron		2,536,000	3,040,000 r/	2,594,000	3,438,082 r/	4,010,261 3/
Ferroalloys:						
Ferrochromium		352,000	600,000	535,000 r/	731,563 r/	799,762 3/
Ferrochromiumsilicon		69,759 r/	48,000	33,550 r/	49,282 r/	55,634 3/
Ferromanganese		620	1,425	1,242	--	NA
Ferrosilicon		119,000 e/	133,000 e/	92,000 r/ e/	140,263	133,269 3/
Silicomanganese		60,175 r/	55,000 e/	57,000 r/ e/	78,495 r/	102,719 3/
Other		10,000	9,000	8,000 r/	9,000 r/ e/	9,000
Total		611,554 r/	846,425 r/	726,792 r/	1,008,603 r/	1,100,384
Steel:						
Crude		3,142,000	3,900,000	3,089,000	4,105,111 r/	4,799,008 3/
Finished, rolled		2,200,000	3,000,000	2,519,000	3,186,000	3,700,000 3/
Lead:						
Mine output, Pb content		29,000 r/	28,400 r/	30,000	34,200 r/	39,300 3/
Metal, smelter, primary and secondary		67,289 r/	81,974	118,632	160,000	185,800 3/

See footnotes at end of table.

TABLE 1--Continued

COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 p/
KAZAKHSTAN--Continued					
Metals--Continued:					
Magnesium	9,000 e/	8,972	9,000 e/	11,031 r/	10,380 3/
Manganese ore:					
Crude	470,000 r/	400,000	634,100	944,000 r/	1,201,900 3/
Marketable	300,000 r/	230,000 e/	399,000	563,000	720,000
Molybdenum, mine output, Mo content	100 e/	100 e/	100 e/	155 r/	215 3/
Nickel, mine output, Ni content e/	7,000	7,000	-- r/	-- r/	3,000
Silver:					
Mine output, Ag content	467,700	690,000 e/	726,321	904,644 r/	927,110 3/
Metal, refined	380,000 e/	390,000 e/	535,800	654,606	670,000
Tin, mine output, Sn content	NA r/	NA r/	NA r/	119,643 r/	218,863 3/
Titanium, metal	12,500	13,000 e/	12,000 e/	8,767 r/	8,280 3/
Vanadium, mine output, V content e/	900	900	1,000	1,000	1,000
Zinc:					
Mine output, Zn content	159,400 r/	224,051	224,300 r/	270,300 r/	322,100 3/
Metal, smelter, primary and secondary	170,081 r/	188,996	240,728	249,327	262,570 3/
Industrial minerals:					
Asbestos, all grades	128,700	182,000 r/	155,400	139,300	233,200 3/
Barite, concentrate	94,100 r/	30,900 r/	9,000 r/	51,200 r/	--
Boron e/	50,000 r/	45,000 r/	40,000 r/	40,000 r/	40,000
Cement	1,120,000	661,000	600,000	837,800 r/	1,175,000 3/
Clay, kaolin e/	40,000	50,000	60,000	70,000	70,000
Phosphate rock	1,700 e/	1,000 e/	100 e/	68 r/	33 3/
Sulfur: e/					
Pyrites	71,000	--	--	--	--
Byproduct:					
Metallurgy	139,000	139,000	212,000 r/	245,000 r/	300,000
Natural gas and petroleum	515,000	778,000 r/	933,000 r/	1,070,000 r/	1,200,000
Total	725,000	917,000 r/	1,150,000 r/	1,320,000 r/	1,500,000
Mineral fuels and related materials:					
Coal	76,800,000	72,600,000	69,800,000	58,377,600 r/	74,872,400 3/
Natural gas thousand cubic meters	6,500,000	8,100,000	7,900,000	9,945,900 r/	11,541,900 3/
Natural gas plant liquids	203,100	159,600	42,100	33,400	NA
Petroleum, crude:					
Gravimetric units	23,000,000	25,800,000	25,900,000	26,735,800 r/	30,647,900 3/
Converted, volumetric units e/ 42-gallon barrels	169,000,000	190,000,000	190,000,000	197,000,000 r/	225,000,000
Refinery products e/	11,000,000	9,200,000 3/	8,000,000	5,700,000	NA
Uranium concentrate, U content	1,320	1,000	1,074 r/	1,367 r/	1,740 3/
KYRGYZSTAN					
Metals:					
Antimony:					
Mine output, Sb content e/	1,200 r/	1,200 3/	150 r/	100 r/	150
Metal and compounds	6,002	4,401	1,298	1,320	1,505 3/
Gold e/ kilograms	1,500	17,400 3/	22,000	20,000	22,000
Mercury:					
Mine output, Hg content e/	500	550	250	300	257 3/
Metal	584	610 r/ e/	620 r/	646 r/	554 3/
Molybdenum	NA	NA	225 e/	250	250
Industrial minerals:					
Cement	544,000 r/	658,000 r/	709,400	386,300	452,900 3/
Fluorspar concentrate	2,767 r/	4,176	3,200 r/ e/	2,997 r/	3,000
Rare earths, rare-earth oxide equivalent:					
Compounds kilograms	NA	NA	NA r/	15,200 r/	6,800
Metals do.	NA	NA	4,680 r/	5,159 r/	7,736 3/
Mineral fuels and related materials:					
Coal	409,000	521,500	432,400	417,000 r/	424,900 3/
Natural gas million cubic meters	26	24	18	25	32 3/
Petroleum, crude	84,300	84,800	78,300	77,000 r/	77,100 3/

See footnotes at end of table.

TABLE 1--Continued

COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 p/
MOLDOVA					
Metals, crude steel	646,000 r/	810,000 r/	718,000	796,000	905,000 3/
Industrial minerals:					
Cement	40,400 r/	121,800	74,000	50,000	222,000 3/
Gypsum	12,700	14,400	19,800 r/	18,500 r/	32,100 3/
Lime	19,900 r/	9,900	12,700 r/	5,200 r/	3,100 3/
Sand and gravel cubic meters	324,000	346,700	248,300	317,700	277,000 3/
Mineral fuels and related materials, peat e/	463,000 r/ 3/	475,000	475,000	475,000	475,000
RUSSIA					
Metals:					
Aluminum:					
Ore and concentrate:					
Alumina	2,105,000	2,400,000	2,465,000	2,657,000	2,850,000
Bauxite e/	3,300,000 r/	3,350,000 r/	3,450,000 r/	3,750,000 r/	4,200,000
Nepheline concentrate, 25% to 30%	1,300,000	940,000	889,000 r/	772,000 r/	814,000 3/
Metal, smelter, primary	2,874,236	2,906,020	3,004,728	3,146,232 r/	3,245,000
Antimony, mine output, Sb content (recoverable) e/	6,000 r/	6,000 r/	4,000 r/	4,000 r/	4,500
Arsenic, white e/	1,500	1,500	1,500	1,500	1,500
Beryllium, beryl, cobbed, 10% to 20% BeO e/ 6/	1,000	1,000	1,000	1,000	1,000
Bismuth, mine output, Bi content e/	50	50	35	50	50
Cadmium metal, smelter	730	790 e/	800 e/	900 e/	925
Chromium, chrome ore, marketable e/	96,700 3/	150,000	130,000	100,000	100,000
Cobalt: e/					
Mine output, recoverable Co content	3,300	3,300	3,200	3,300	3,600
Metal, refined	4,200	4,100	3,500	3,600	4,400
Copper:					
Ore, Cu content, recoverable	523,000	505,000 e/	500,000	530,000 e/	570,000
Metal:					
Blister: e/					
Primary	550,000	535,000	510,000	540,000	580,000
Secondary	20,000	35,000	40,000	158,000 r/	200,000
Total	570,000	570,000	550,000	698,000	780,000
Refined:					
Primary	543,000	535,000	543,000	600,000 r/	640,000
Secondary	57,000	65,000	77,000 r/	150,000 r/	200,000
Total	600,000	600,000	620,000	750,000	840,000
Gold, mine output, Au content kilograms	123,300	124,000 e/	114,900	125,870	143,000 3/
Iron and steel:					
Iron ore, 55% to 63% Fe	72,100,000 r/	70,900,000 r/	72,343,000 r/	81,311,000 r/	86,630,000 3/
Metal:					
Pig iron	36,061,000	37,327,000	34,827,000	40,854,200 r/	44,618,100 3/
Direct-reduced iron	1,500,000	1,730,000 e/	1,550,000	1,880,000	1,900,000
Ferroalloys: e/					
Blast furnace:					
Ferromanganese	67,000 3/	47,100 3/	65,000 r/ 3/	90,000	70,700 3/
Ferrophosphorus	2,300 3/	3,600 3/	3,500	3,500	3,500
Spiegeleisen	7,000	7,000	7,000	7,000	7,000
Electric furnace:					
Ferrochromium	135,000	247,000	203,000 3/	249,000 3/	274,000 3/
Ferrochromiumsilicon	5,000	5,000	4,000	4,500 r/	4,500
Ferronickel	75,000 3/	40,000	30,000	33,000 r/	35,000
Ferrosilicon	460,000	510,000	496,000 3/	601,000 3/	652,000 3/
Silicon metal	40,000	40,000	40,000	40,000	40,000
Other	40,000	40,000	40,000	40,000	40,000
Total	831,000	940,000	889,000 r/	1,070,000 r/	1,130,000
Steel:					
Crude	49,193,000	48,499,300	43,821,800	51,524,100 r/	59,097,500 3/
Finished, rolled	39,000,000	37,800,000	35,134,000	40,900,000	46,900,000 3/
Pipe	3,600,000	3,500,000	2,816,000	3,004,000 r/	4,385,000 3/
Lead:					
Mine output, recoverable Pb content	23,000	16,000	13,000	13,000 e/	13,300
Metal, refined, primary and secondary e/	30,000	52,000	36,000	62,000 r/	59,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 p/
RUSSIA--Continued					
Metals--Continued:					
Magnesium: e/					
Magnesite	1,000,000	1,040,000	851,845 3/	900,000	1,000,000
Metal, including secondary	35,000	39,500	41,500	45,000	45,000
Manganese, mine output, Mn content e/	10,000	21,000	21,000	22,000	23,000
Mercury e/	50	50	50	50	50
Molybdenum e/	2,000	2,000	2,000	2,400	2,400
Nickel: e/					
Mine output, recoverable Ni content	230,000	260,000	250,000	260,000	270,000
Nickel products, including ferronickel	190,000	230,000	227,000	238,000	248,000
Platinum-group metals: e/					
Platinum	25,000 r/	25,000 r/	25,000 r/	27,000 r/	30,000
Palladium	80,000	80,000	80,000	85,000	94,000
Other	3,500	3,500	3,500	3,700	4,100
Total	109,000 r/	109,000 r/	109,000 r/	116,000 r/	128,000
Silver e/ kilograms	400,000	400,000	350,000	375,000	370,000
Tin: e/					
Mine output, recoverable Sn content	8,000	7,500	4,500	4,500	5,000
Metal, smelter:					
Primary	9,000 r/	6,700 r/	3,000 r/	3,400 r/	4,700
Secondary	1,000 r/	1,000 r/	500 r/	400	500
Total	10,000 r/	7,700 r/	3,500 r/	3,800 r/	5,200
Titanium sponge e/	20,000	21,000	22,000	24,000	30,000
Tungsten concentrate, W content e/	3,000	3,000	3,000	3,500	3,500
Vanadium metal e/	11,000	9,000	9,000	9,000	9,000
Zinc: e/					
Mine output, recoverable Zn content	126,000 3/	121,000	115,000	132,000	136,000 3/
Metal, smelter, primary and secondary	172,000	189,000	192,000	221,000 r/	230,000
Zirconium, baddeleyite concentrate, averaging 98% ZrO_2	5,080	5,745	6,293	6,800	6,500
Industrial minerals:					
Asbestos, grades I-VI	615,000 e/	710,000 e/	600,000 r/ e/	674,699 r/	752,200 3/
Barite e/	70,000 3/	60,000	60,000	60,000	60,000
Boron e/	1,000	1,000	1,000	1,000	1,000
Cement, hydraulic	27,800,000	26,700,000 r/	26,000,000 r/	28,400,000 e/	32,400,000 3/
Clays, kaolin (concentrate)	50,000 r/	50,000 r/	50,000 r/	40,600 r/	45,000
Diamond: e/					
Gem carats	10,500,000 r/	11,200,000	11,600,000 r/	11,500,000	11,600,000
Industrial do.	10,500,000	11,200,000	11,600,000 r/	11,500,000	11,600,000
Synthetic do.	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
Total do.	101,000,000	102,000,000	103,000,000	103,000,000	103,000,000
Feldspar e/	45,000	45,000	40,000	45,000	45,000
Fluorspar, concentrate 55% to 96.4% CaF_2	NA r/	6,200 r/	120,200 r/	153,800 r/	187,600
Graphite e/	6,000 r/	6,000 r/	6,000 r/	6,000 r/	6,000
Gypsum	1,534,000	559,000	609,400	650,000 r/	700,000
Iodine e/ kilograms	250,000	250,000	280,000	300,000	300,000
Lime, industrial and construction	7,822,000	7,626,000	7,000,000 e/	7,000,000 e/	8,000,000
Lithium minerals, not further specified e/	2,000	2,000	2,000	2,000	2,000
Mica e/	100,000	100,000	100,000	100,000	100,000
Nitrogen, N content of ammonia	7,900,000	7,150,000	6,500,000 e/	7,633,100 r/	8,735,000
Phosphate rock (P_2O_5 content): e/					
Apatite concentrate, 37% to 39.6%	2,900,000	3,300,000 r/	3,735,000 r/ 3/	4,161,000 r/ 3/	4,150,000 3/
Sedimentary rock, 19% to 30%	300,000	300,000 r/	300,000 r/	300,000 r/	300,000
Total	3,200,000	3,600,000	4,040,000 r/	4,460,000 r/	4,450,000
Potash, marketable, K_2O equivalent e/	2,620,000 r/	3,400,000	3,500,000	4,200,000	3,700,000
Salt, all types	2,100,000	2,100,000	2,200,000 r/	3,200,000 r/	3,200,000
Sodium compounds, n.e.s., carbonate	1,500,000	1,700,000	1,600,000 e/	NA	NA
Sulfur: e/					
Native	70,000	50,000	50,000	50,000	50,000
Pyrites	400,000	400,000	254,000 r/	300,000 r/	350,000
Byproduct, natural gas	3,000,000	2,950,000	3,940,000 r/	4,410,000 r/	4,900,000
Other	325,000	350,000	411,000 r/	510,000 r/	600,000
Total	3,800,000	3,750,000	4,660,000 r/	5,270,000 r/	5,900,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
RUSSIA--Continued						
Industrial minerals--Continued:						
Sulfuric acid		5,650,000 e/	6,100,000	5,840,000	208,000 r/	184,000
Talc e/		100,000	90,000	79,000 3/	90,000 r/	100,000
Vermiculite e/		30,000	25,000	25,000	25,000	25,000
Mineral fuels and related materials:						
Coal:						
Anthracite		17,300,000 r/	13,600,000 r/	10,400,000 r/	9,900,000 r/	1,050,000 3/
Bituminous		149,700,000 r/	146,400,000 r/	142,700,000 r/	155,800,000 r/	172,060,000 3/
Lignite		90,000,000	85,200,000 r/	78,800,000	83,400,000	83,740,000 3/
Total 7/		257,000,000 r/	245,000,000 r/	232,000,000 r/	249,000,000 r/	256,850,000 3/
Coke, 6% moisture content		25,300,000	25,600,000	23,600,000	28,100,000 e/	60,000,000
Gas, natural, marketed	million cubic meters	601,000	571,000	591,400	592,000 r/	584,000
Natural gas plant liquids	42-gallon barrels	67,525,000	71,175,000	80,300,000	84,315,000	NA
Oil shale		2,000,000 e/	2,000,000 e/	1,715,000	1,950,000 e/	1,676,000
Peat, fuel use		1,500,000 r/	2,100,000 r/	1,700,000 r/	2,000,000 r/	2,000,000
Petroleum:						
Crude in:						
Gravimetric units		301,000,000	306,000,000	303,300,000	305,000,000 e/	325,000,000
Volumetric units e/	thousand 42-gallon barrels	2,220,000	2,250,000	2,230,000	2,240,000	2,390,000
Refinery products 8/		183,000,000	178,000,000	164,000,000 r/	169,000,000 e/	174,000,000
Uranium concentrate, U content e/		2,000	2,000	2,000	2,000 r/	2,500
TAJIKISTAN 9/						
Metals:						
Aluminum, primary		198,300	206,400 r/	196,300 r/	229,100 r/	300,000
Antimony, Sb content of concentrate e/		1,000	1,200 3/	1,500	1,800	2,000
Bismuth, mine e/		5	5	5	5	5
Gold	kilograms	1,100 r/ e/	2,550	3,000	2,700 e/	2,700
Lead, Pb content of concentrate e/		800	800	800	800	800
Mercury, Hg content of concentrate e/		45	40	35	35	40
Silver, Au content of concentrate	kilograms	NA	NA	5,000	5,000 e/	5,000
Tungsten concentrate, W content e/		50	--	--	--	-
Industrial minerals:						
Cement		50,000	36,400	17,700	30,000	50,000
Fluorspar e/		9,000	9,000	9,000	9,000	9,000
Gypsum e/		30,000	26,000	31,700	35,000	35,000
Mineral fuels and related materials:						
Coal		20,000	17,000	16,000	16,600 r/	20,700
Natural gas	thousand cubic meters	35,200	41,600	32,400	40,000	40,000
Petroleum, crude		30,000	26,000	19,400	20,000 e/	20,000
TURKMENISTAN						
Industrial minerals:						
Bentonite e/		50,000	50,000	50,000	50,000	50,000
Bentonite powder		33	250	250 e/	250 e/	250
Bischofite		3,230	90	90 e/	100 e/	100
Cement e/		450,500 3/	450,000	450,000	450,000 r/	450,000
Epsomite		14,250	NA	NA	NA	NA
Ferrous bromide (51% Br)		255	83	80 e/	85 e/	85
Gypsum e/		169,577 3/	85,000 r/	100,000 r/	100,000 r/	100,000
Iodine	kilograms	34,600	87,100	90,000 e/	150,000 r/ e/	150,000
Lime		9,000	16,000	15,000	16,000 r/ e/	16,000
Nitrogen, N content of ammonia		69,500	60,700	75,000 e/	75,000 r/ e/	75,000
Salt		255,738	216,500	215,000 e/	215,000 r/ e/	215,000
Sodium sulfate		30,820	56,552	55,000 e/	60,000 e/	60,000
Sulfur		8,112	9,227	9,000 e/	9,000 r/ e/	9,000
Mineral fuels and related materials:						
Natural gas	million cubic meters	35,200	17,300	14,000 e/	22,800 e/	47,000
Natural gas plant liquids	42-gallon barrels	4,380,000	6,205,000	6,205,000	6,205,000	NA
Petroleum, crude		4,300,000	4,700,000	6,500,000 e/	7,800,000 r/ e/	7,350,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 p/
UKRAINE					
Metals:					
Alumina	1,000,000 e/	1,080,000 e/ r/	1,291,000	1,230,000	1,360,000
Aluminum:					
Primary	90,000 e/	100,500	106,700	115,425 r/	119,290 3/
Secondary	NA	NA	71,164	110,940	128,952 3/
Cadmium, metal e/	25	25	25	25	25
Germanium e/	22	22	22	22	NA
Iron and steel:					
Iron ore, marketable	47,600,000	53,000,000 e/	50,758,000 r/	47,769,100	55,883,200 3/
Metal:					
Pig iron	18,143,000	20,561,000	20,840,000	23,009,800 r/	25,698,700 3/
Ferroalloys: e/					
Blast furnace:					
Ferromanganese	100,000	125,000	112,400 3/	57,800 3/	85,400 3/
Spiegeleisen	2,500	2,500	2,500	-- r/ 3/	5,400 3/
Electric furnace:					
Ferromanganese	170,000	160,000	150,000	199,539 3/	252,679 3/
Ferronickel	8,300 3/	--	--	--	--
Ferrosilicon	250,000	300,000	222,511 3/	243,600 3/	323,417 3/
Silicomanganese	600,000	560,000	485,560 3/	498,905 3/	684,040 3/
Other	25,000	25,000	20,000	25,000	25,000
Total	1,160,000	1,170,000	993,000	1,020,000 r/	1,380,000
Steel:					
Crude	22,100,000	25,600,000	23,461,000	27,390,000 r/	31,780,000 3/
Finished, rolled	17,045,000	19,525,000	17,776,000	19,300,000	22,500,000 3/
Pipe	2,001,300	1,844,300	1,519,300	1,175,000	1,670,000 3/
Lead, refined (secondary)	21,000 e/	11,000 e/	9,000 e/	9,902 r/	15,034 3/
Magnesium, primary	10,000 e/	10,000 e/	5,043 r/	3 r/	NA
Manganese:					
Marketable ore	3,070,000	3,040,000	2,226,000	1,984,800 r/	2,740,600 3/
Mn content e/	1,040,000	1,030,000	755,000	675,000	930,000
Metal	NA	NA	NA	NA	NA
Mercury e/	30	25	20	NA	NA
Nickel, mine output, Ni content of FeNi produced e/	500	--	--	--	--
Silicon e/	1,000	1,000	1,000	1,000	NA
Titanium:					
Ilmenite concentrate, 42% TiO	NA r/	NA r/	507,435 r/	536,542 r/	576,749 3/
Rutile concentrate, 95% TiO e/	50,000	50,000	50,000	49,000 r/	58,600 3/
Metal, sponge e/	--	1,200 r/	4,000 r/	4,000 r/	NA
Zinc, metal, secondary e/	2,000	2,000	--	--	--
Zirconium concentrates e/	55,000 r/	65,000 r/	65,000 r/	69,000 r/	75,000
Industrial minerals:					
Cement	5,017,000	5,098,000	5,591,200 r/	5,828,100 r/	5,311,400 3/
Clays: e/					
Bentonite	300,000	300,000	300,000	300,000	300,000
Kaolin	250,000	250,000	201,670 3/	221,526 3/	225,000
Diamond, synthetic e/ carats	8,000,000	8,000,000	8,000,000	8,000,000	8,000,000
Graphite	5,000 e/	5,000 e/	5,104 3/	7,461 3/	7,431 3/
Nitrogen, N content of ammonia	3,300,000	3,400,000 e/	3,300,000 e/	4,514,500 r/	4,351,400 3/
Potash, K_2O content e/	76,000	60,000 3/	35,000	35,000	30,000
Salt, rock	2,800,000 e/	2,500,000 e/	2,500,000 e/	2,185,300 r/	2,286,500 3/
Sulfur, native e/	168,000 3/	100,000	97,000	80,000	80,000
Mineral fuels and related materials:					
Coal:					
Hard thousand tons	NA	NA	41,750	45,216	40,983 3/
Brown do.	NA	NA	1,409	1,184	1,067 3/
Coking do.	NA	NA	32,608	35,424	38,940 3/
Total do.	70,500	76,900	75,767 r/	81,824 r/	80,990 3/
Coke	14,800,000	15,000,000 e/	13,956,700	17,309,700 r/	19,362,600 3/
Natural gas thousand cubic meters	18,408,000	18,131,000	17,967,000	18,092,100	17,847,100 3/
Natural gas plant liquids 42-gallon barrels	5,475,000	9,490,000	9,125,000	8,395,000	NA
Peat e/	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000

See footnotes at end of table.

TABLE 1--Continued
COMMONWEALTH OF INDEPENDENT STATES: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 p/
UKRAINE--Continued						
Mineral fuels and related materials--Continued:						
Petroleum:						
Crude:						
As reported	gravimetric tons	4,097,100	4,131,200	3,894,800	3,797,900 r/	3,692,900 3/
Converted e/	42-gallon barrels	30,100,000	30,400,000	28,600,000	27,900,000	27,200,000
Refinery products		13,477,000	12,833,000	13,510,000	13,500,000 e/	NA
Uranium concentrate, U content e/		500	500	500	500	600 3/
UZBEKISTAN						
Metals:						
Aluminum, secondary e/		2,500	2,700 3/	3,000	3,000	3,000
Copper:						
Mine output, Cu content		NA r/	NA r/	NA r/	91,600 r/	91,800 3/
Metal: e/						
Blister:						
Primary		75,000	80,000	89,930 3/	72,000	75,000
Secondary		5,000	5,000	5,000	5,000	5,000
Total		80,000	85,000	94,930 3/	77,000	80,000
Refined		100,000	110,000 r/	94,900 r/	77,000 r/	80,000
Gold	kilograms	72,000 e/	81,700 e/ r/	80,000	66,028 r/	62,276 3/
Lead, mine output, Pb content		10,000 e/	-- 10/	-- 10/	-- 10/	-- 10/
Molybdenum, mine output, Mo content e/		500	500	350 r/	350 r/	350
Silver, mine output	kilograms	70,000 e/	70,000 e/	70,000 e/	88,700 r/	89,900
Steel:						
Crude		444,000	365,000 r/	344,000	343,000 e/	420,000 3/
Rolled		390,000	350,000	322,000	300,000	400,000
Tungsten, mine output, W content e/		300	250	200	-- r/	-- 3/
Zinc:						
Mine output, Zn content		12,000 e/	-- 10/	-- 10/	-- 10/	-- 10/
Metal, smelter, primary e/		45,000	53,000	52,000	27,000 3/	18,000
Industrial minerals:						
Cement		3,300,000	3,300,000	3,400,000	4,471,000 r/	3,521,000 3/
Clays, kaolin e/		5,500,000	5,500,000	5,500,000	5,500,000	5,333,000 3/
Feldspar		NA r/	NA r/	NA r/	300 r/	4,300 3/
Fluorspar		90,000 e/	90,000 e/	80,000 e/	-- r/	--
Graphite e/		60	60	60	60	60
Iodine e/	kilograms	--	--	500	2,000	2,000
Mineral fertilizers		1,000,000	955,000	976,000	900,000	NA
Nitrogen, N content of ammonia		950,000	950,000	875,000	790,000 e/	810,000
Phosphate rock, gross weight e/	thousand tons	--	--	100	150	300
Sulfur, byproduct: e/						
Metallurgy		145,000 3/	165,000	170,000 3/	175,000	180,000
Natural gas and petroleum		250,000 3/	250,000	275,000 3/	280,000	280,000
Total		395,000 3/	415,000	445,000 3/	455,000	460,000
Mineral fuels and related materials:						
Coal		2,844,000	3,130,000	2,950,000	3,033,000 r/	2,556,000 3/
Natural gas	million cubic meters	49,000	51,200	54,800	55,600	55,600 3/
Natural gas plant liquids	42-gallon barrels	18,250,000	16,425,000	16,425,000	16,425,000	16,425,000 3/
Petroleum and gas condensate		7,624,000	7,891,000	8,100,000	8,100,000	NA
Uranium, mine output, U content		1,459	1,764	2,000	2,159	2,054 3/

e/ Estimated. p/ Preliminary. r/ Revised. NA Not available. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes data available through November 2001.

3/ Reported figure.

4/ For some metals, including copper, gold, lead, molybdenum, silver, and zinc, and for a number of industrial minerals that Azerbaijan had produced, there was not sufficient information to derive production estimates or to determine if production had ceased.

5/ Includes byproduct salt from potash production.

6/ It appears that Russia in the mid-1990s stopped mining beryllium ore. It was reported that in 1998 there was no production of beryllium ore.

7/ Total coal production numbers rounded.

8/ Not distributed by type and therefore not suitable for conversion to volumetric units. Data include all energy and nonenergy products but exclude losses.

9/ Tajikistan produces a number of other mineral commodities not listed in the table for which information is inadequate to derive estimates.

10/ Mining operations appear to have been curtailed sharply or to have ceased.

TABLE 2
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
ARMENIA			
Aluminum, rolled and foil	Kanaker aluminum plant	K'anak'err	25,000
Copper:			
Mine output, Cu content	Facilities:	Located at:	30,000 4/
	Kapan mining directorate	Kapan	
	Shamlugh mining directorate (not in operation)	Shamlugh	
	Akht'ala mining directorate (not in operation)	Akht'ala	
	Zangezur copper-molybdenum complex mining Kadzharan deposit	Kadzharan	
	Agarak copper-molybdenum mining and processing complex	Agarak	
Blister	Manes and Vallex joint stock company	Alaverdi	15,000
Diamonds, cut stones	Aghavni diamond cutting works	Nor Geghi	NA
Do.	Amma group diamond cutting works	Artashat	NA
Do.	Andranik diamond cutting works	Nor Hachyn	NA
Do.	Diamond Company of Armenia (DCA)	Yerevan	NA
Do.	Lori diamond cutting works	Nor Hachyn	NA
Do.	Lusampor	Melik'gyugh	NA
Do.	Punji diamond cutting works	Yerevan	NA
Do.	Sapphire diamond cutting works	Nor Hachyn	NA
Do. thousand carats	Shoghakan gem cutting plant	do.	120
Gold kilograms	Companies:	Located at:	2,000 4/
	Zod mining complex (mining ceased in 1997)	Zod	
	Megradzor deposit (mining ceased in 1997)	Megradzor	
Do. do.	Ararat gold processing and tailings recovery plant	Ararat	1,000
Molybdenum, mine output, Mo content	Complexes:	Located at:	8,000 4/
	Zangezur copper-molybdenum complex mining Kadzharan deposit	Kadzharan	
	Agarak copper-molybdenum mining and processing complex	Agarak	
Perlite thousand tons	Aragats-Perlite mining and beneficiation complex	Aragats Lerrnagagat'	200
Zinc, mine output, Zn content	Kapan mining directorate	Kapan	NA
AZERBAIJAN			
Aluminum	Sumgait smelter	Sumqayit	55,000
Alumina	Gyandzha refinery	Ganca	100,000
Alunite ore	Zaglik alunite mining directorate	Zaylik	600,000
Cement	Plants:	Located at:	1,000,000 4/
	Karadagly cement plant	Karadagly	
	Tauz cement plant	Tovuz	
Iodine and bromine	Baku, Karadagly, Neftechala plants	Process oil well brines at plants in Baku, Karadagly, and Neftechala	NA
Iron ore, marketable	Dashkasan mining directorate	Dashkasan region	1,000,000
Natural gas, processing	Karadagly plant	Near Baku	NA
Petroleum and natural gas: 5/			
Crude petroleum and gas condensate	State Oil Company of Azerbaijan (SOCAR) for natural gas production	Production from 37 onshore deposits, including deposits on the Ashperon Peninsula and in the Izhnekurin Valley	8,000,000
Do.	do.	Production from 17 onshore fields with about 45% of natural gas produced from the Bakhar field and 50% of crude petroleum produced from the Gunashli field	8,000,000
Natural gas million cubic meters	Companies	Production from:	8,000 4/
	State Oil Company of Azerbaijan (SOCAR) for natural gas production	Seventeen onshore fields with about 45% of natural gas produced from the Bakhar field and 50% of crude petroleum produced from the Gunashli field	
	Azerbaijan International Operating Co. (AIOC) for oil production	Thirty seven onshore deposits that include deposits on the Ashperon Peninsula and in Izhnekurin Valley	

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
AZERBAIJAN--Continued			
Petroleum, refined	Azernefteyag (formerly Baku) refinery	Baku	12,000,000 6/
Do.	Azernefteyagandzhah (formerly Novo-Baku) refinery	do.	10,000,000 6/
Steel:			
Crude	Azerboru production amalgamation	Sumqayit	800,000
Rolled	do.	do.	700,000
Pipe, tubes	do.	do.	540,000
BELARUS			
Cement	Volkovysk and Krichevskiy plants	Wawkavysk, Mahilyowskaya Voblasts'	2,200,000
Diamonds	Kristall plant	Homyel'skaya Voblasts'	NA
Nitrogen, N content of ammonia	Grodno "Azot" Association	Hrodna region	1,000,000
Peat, fuel use	Production at 37 enterprises producing mainly briquets	All regions of country	5,000,000 7/
Petroleum:			
Crude	Belarusneft Association	Southeastern part of country	2,000,000
Refined	Mazyr refinery	Mazyr	16,000,000 8/
Do.	Naftan refinery	Navapolatsk	8,450,000 8/
Potash, K_2O equivalent	Belaruskaliy Association	Salihorsk area	5,000,000
Steel:			
Crude	Belarus electric steelworks	Zhlobin	1,400,000
Pipe	Mahilyow metallurgical works	Mahilyowskaya Voblasts'	80,000
GEORGIA			
Arsenic:			
As content of ore	Deposits: Lukhumi deposit Tsana deposit	Located at: Racha Svanetiya	2,000 4/
Metal and compounds	Racha mining and chemical plant	Racha	NA
Do.	Tsana mining and chemical plant	Ts'ana	NA
Barite	Chordskoye deposit	Onis Raioni (Onskiy Rayon)	70,000
Bentonite	Gumbrskoye and Askanskoye deposits	Gumbra, Askana regions	200,000
Cement	Rust'avi cement plant	Rust'avi	1,500,000
Coal	Tkibuli-Shaorskoye, Tkvarchelskoye deposits	Tqibuli, Tqvrarch'eli, Akhalts'ikhis Raioni regions	300,000
Copper, Cu content of ore	Madneuli complex	Marneulis Raioni	12,000
Diatomite	Kisatibskoye deposit	K'isat'ibi region	150,000
Ferroalloys:			
Ferromanganese	Zestafoni plant	Zestap'onis Raioni	100,000
Silicomanganese	do.	do.	250,000
Manganese sinter	do.	do.	250,000
Gold	Kvartsit joint venture	Madneuli deposit	3
Lead-zinc:			
Pb content of ore	Kvaisi deposit	Kvaisi	1,200
Zn content of ore	do.	do.	3,000
Manganese, marketable ore	Chiat'ura complex	Chiat'ura	200,000
Petroleum:			
Crude	About 60 wells accounting for 98% of output	Mirzaani, Zemo T'elet'i, Sup'sa regions	200,000
Refined	Batumi refinery	Bat'umi	NA
Steel, crude	Rust'avi steel mill	Rust'avi	1,400,000
KAZAKHSTAN			
Alumina	Pavlodar aluminum plant	Pavlodar	1,250,000
Arsenic trioxide	Chimkent polymetallic enterprise and other nonferrous metallurgical enterprises	Shymkent	3,500
Asbestos	Complexes: Dzhetygara complex Chilisay complex	Located at: Qostanay Aqtobe phosphorite basin	1,000,000 4/
Barite	Facilities: Karagaylinskiy and Zhayrem mining and beneficiation complexes Tujuk Mine Achisay polymetallic complex	Located at: Karagayly, Khrebet; Zhayrem deposit Almaty Kentau region	300,000 4/
Bauxite	Turgayskiy and Krasnooktyabrskiy bauxite mining complexes	Central Kazakhstan	4,000,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
KAZAKHSTAN--Continued			
Beryllium, metal	Ul'ba metallurgical plant	Oskemen	NA
Bismuth, metal	Facilities: Ust-Kamenogorsk lead-zinc metallurgical plant Leninogorsk lead smelter	Located at: Oskemen Leninogorsk	70
Cadmium	Leninogorsk mining and beneficiation complex	do.	1,200
Chromite	Donskoy mining and beneficiation complex	Khromtau region	3,800,000
Coal	Karaganda Basin	Central and north-central parts of the country	50,000,000
Do.	Ekibastuz Basin	do.	85,000,000
Do.	Maykuben Basin	do.	10,000,000
Do.	Turgay Basin	do.	1,000,000
Copper:			
Mining, recoverable, Cu content	Balkhash	Zhezkazgan region	200,000
Do.	Zhezkazgan	do.	250,000
Do.	Irtysh	Ertis region	10,000
Do.	Leninogorsk	Leninogorsk region	15,000
Do.	Zhezkent	Zhezkent region	25,000
Do.	Zyryanovsk mining and beneficiation complexes	Zyryanovsk region	5,000
Do.	East Kazakhstan copper-chemical complex	East Kazakhstan region	10,000
Metallurgy, metal	Balkhash	Zhezkazgan region	150,000
Do.	Zhezkazgan	do.	250,000
Do.	Irtysh smelting and refining complex	Ertis region	40,000
Blister	Ust-Kamenogorsk plant	Oskemen	37,100
Refined	do.	do.	6,600
Ferroalloys:			
Ferrochrome:			
High-carbon 60%	Aktybinsk plant	Aqtobe	200,000
Medium-carbon 60%	do.	do.	200,000
Ferrosilicon	Aksu plant	Aksu	700,000
Ferrosilicochrome	do.	do.	700,000
Ferrochrome, high-carbon	do.	do.	500,000
Silicomanganese	do.	do.	90,000
Gallium	Pavlodar aluminum plant	Pavlodar	NA
Gold	Byproduct of polymetallic ores and native gold mining	Byproduct gold colocated with nonferrous metals mining	30
Iron and steel:			
Pig iron	Ispat-Karmet Steelworks	Karaganda	5,000,000
Steel, crude	do.	do.	6,300,000
Iron ore, marketable	Sokolovsko-Sarbay and Lisakovskiy mining and metallurgical complexes	Qostanay	25,000,000
Lead:			
Mining, recoverable Pb content of ore	Achisay	Kentau and Karatau regions	40,000
Do.	Akchatau	Zhezkazgan region	10,000
Do.	Irtysh	Oskemen region	10,000
Do.	Karagayly	Karagayly region	20,000
Do.	Leninogorsk	Leninogorsk region	60,000
Do.	Tekeli	Tekeli and Taldyqorghan regions	20,000
Do.	Zhezkent	Semey region	NA
Do.	Sary-Arkapolimetal	Zhayrang region	20,000
Do.	Zyryanovsk complexes	Zyryanovsk region	20,000
Do.	East Kazakhstan copper-chemical complex	East Kazakhstan region	NA
Refined	Ust-Kamenogorsk plant	Oskemen	250,000
Do.	Shymkent	Shymkent	NA
Manganese, crude ore	Companies: Atasurda Kazakmarganets Sary-Arkapolimetal	Located at: Atasu Zhezdy Zhayrang region	2,550,000 4/
Molybdenum:			
Mining, recoverable content of ore	Facilities: Kounrad Mine Karaobinskoye deposit Sayak deposit	Located at: Balqash complex Karaoba region Sayaq (Sayak) region	6,000 4/

See footnotes at end of table.

TABLE 2--Continued

COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
KAZAKHSTAN--Continued			
Molybdenum--Continued:			
Metal	Akchatau molybdenum metal plant	Zhezkazgan region	NA
Natural gas million cubic meters	Companies:	Located at:	12,000 4/
	Aktyubinskmunaigaz	Aqtobe	
	Embamunaigaz	Emba district	
	Huricane Kumkol Munai	Aral Sea region	
	Karachaganak field	Northwestern Kazakhstan	
	Mangistaumunaigaz	Mangghhyshlaq Peninsula	
	Tengizchevroil joint venture	Tengiz deposit	
	Uzenmunaigaz	Uzen deposit	
Petroleum:			
Crude	Companies:	Located at:	32,000,000 4/
	Aktyubinskmunaigaz	Aqtobe	
	Embamunaigaz	Emba district	
	Huricane Kumkol Munai	Aral Sea region	
	Karachaganak field	Northwestern Kazakhstan	
	Mangistaumunaigaz	Mangghhyshlaq Peninsula	
	Tengizchevroil joint venture	Tengiz deposit	
	Uzenmunaigaz	Uzen deposit	
Refined, crude oil throughput	Atyrau refinery	Atyrau	5,200,000
Do.	Pavlodar refinery	Pavlodar	8,100,000
Do.	Symkent refinery	Shymkent	7,900,000
Phosphate rock	Companies:	Located at:	10,000,000 4/
	Karatau production association	Zhambyl and Shymkent regions	
	Chilisay mining directorate	Aqtobe phosphorite basin	
Rare metals (columbium, indium, selenium, tellurium)	Aktau complex	Aktau	NA
Do.	Belogorsky rare metals plant	Belogorskiy	NA
Do.	Chimkent polymetallic plant	Shymkent	NA
Do.	Ust-Kamenogorsk lead-zinc plant	Oskemen	NA
Do.	Akchatau mining and beneficiation complex	Zhezkazgan region	NA
Rhenium	Balkhash copper mining and metallurgical complex	do.	NA
Silver, refined	Facilities:	Located at:	800 4/
	Ust-Kamenogorsk	Zhezkazgan region	
	Leninogorsk	Leninogorsk	
	Chimkent metallurgical plants	Shymkent	
Tantalum	Yermak ferroalloy plant	Aksu	NA
Tin	Akchatau mining and beneficiation complex	Akzhaik deposit, Zhezkazgan region	700
Titanium, metal	Ust-Kamenogorsk titanium-magnesium plant	Oskemen	35,000
Uranium, U content	Facilities:	Located at:	3,500 4/
	Stepnogorsk	Stepnogorsk	
	Shevchenko	Aqtau	
	Taboshara	Taboshara	
	Prikaspiskiy ore enrichment center	Aqtau	
	Tselinny chemical complex	Stepnogorsk	
Zinc, metal	Leninogorsk	Leninogorsk	106,500 9/
Do.	Ust-Kamenogorsk plant	Oskemen	215,000 9/
KYRGYZSTAN			
Antimony:			
Sb content of ore	Kadamzhay and Khaydarkan complexes	Kadamzhayskiy Rayon, Khaydarkan regions	2,400
Metal	Kadamzhay metallurgical complex	Kadamzhayskiy Rayon	20,000
Cement	Kantskiy cement plant	Kant	1,500,000
Coal	Seven underground mines, five open pits	Southwestern, central, and northeastern parts of the country	2,200,000
Fluorspar, concentrate	Khaydarkan mining and metallurgical complex	Khaydarkan deposit	5,000
Gold:			
Au content of ore	Makmalzoloto	Makmal deposit	3
Do.	Kumtor Gold Company	Kumtor deposit	22
Do.	Solton-Sary Mine	Naryn	NA
Refined	Kara Balta refinery	Chuy Oblasty	22

See footnotes at end of table.

TABLE 2--Continued

COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
KYRGYZSTAN--Continued			
Mercury:			
Hg content of ore	Khaydarkan mining and metallurgical complex	Khaydarkan deposit	700
Metal	do.	Khaydarkan	1,000
Molybdenum, for nonmetallurgical uses	Molibden Joint Stock Company	Chuy Oblasty	NA
Natural gas million cubic meters	Kyrgyzazmunayzat	Approximately 300 wells, major deposits: Changyr-Tash, Izbaskentskoye, Mayluu-Suu, Chigirchik Pereval, Kara-Agach, Togap-Beshkenskoye, Susashoye	100 4/
Petroleum	do.	do.	150,000
Rare earths:			
Concentrates, gross weight	Kyrgyz mining complex	Ak-Tyuz deposit	14,000
Compounds and metals, rare-earth oxide equivalent	Kyrgyz chemical and metallurgical plant	Orlovka	8,000
Uranium, unprocessed	Kara Balta complex	Chuy	NA
MOLDOVA			
Oil and natural gas:			
Oil	Redeco Moldova oil and gas company	Valeni oil field	100,000
Natural gas thousand cubic meters	do.	Victorovca gas field	5,000
Steel, crude	Moldova Steel Works minimill	Ribnita, Transnistria region	1,000,000
RUSSIA			
Alumina	Achinsk	Achinsk in East Siberia	900,000
Do.	Bogoslovsk	Ural'skiye Gory	1,050,000
Do.	Boksitogorsk	European north	200,000
Do.	Nadvoitsy	Nadvoitsy in Karelia	266,000
Do.	Uralsk	Kamensk region	536,000
Do.	Volkhov	Volkhov, east of St. Petersburg	45,000
Aluminum, primary smelters	do.	do.	20,000
Do.	Uralsk	Kamensk	70,000
Do.	Bogoslovsk	Krasnotur'insk	162,000
Do.	Novokuznetsk	Novokuznetsk	284,000
Do.	Kandalaksha	Kola Pennisula	62,500
Do.	Nadvoitsy	Nadvoitsy in Karelia	68,000
Do.	Volgogard	Volgogradskaya Oblast'	168,000
Do.	Irkutsk	Sher'kovo, near Irkutskaya Oblast'	262,000
Do.	Krasnoyarsk	Krasnoyarskiy Kray	850,000
Do.	Bratsk	Bratsk	900,000
Do.	Sayansk	Sayanogorsk	400,000
Antimony:			
Sb content of concentrate	Deposits: Sarylakh deposit Sentachan deposit	Located at: Ust'-Nera region Northeastern Sakha (Yakutiya) Republic	6,000 4/
Compounds and metals	Ryazsvetmet plant	Ryazanskaya Oblast'	NA
Apatite, concentrate	Khibiny apatite asociation	Kola Peninsula	15,000,000
Do.	Kovdor iron ore mining association	do.	700,000
Asbestos	Kiyembay	Orenburgskaya Oblast'	500,000
Do.	Tuvaasbest	Tyva	250,000
Do.	Uralaasbest	Central Ural'skiye Gory	1,100,000
Bauxite	North-Urals mining company	Severoural'sk region	NA
Do.	South-Urals mining company	South Ural'skiye Gory	NA
Do.	Severnaya Onega Mine	Northwest region	800,000
Boron, boric acid	Bor Association	Maritime territory	140,000
Do.	Amur River complex	Far East	8,000
Do.	Alga River chemical complex	do.	12,000
Chromite	Saranov complex	Saranovskiy	200,000
Coal	Donets (east) Basin	Rostovskaya Oblast'	30,000,000
Do.	Kansk Achinsk Basin	East Siberia	50,000,000
Do. thousand tons	Kuzntesk Basin	West Siberia	160,000
Do.	Moscow Basin	Moscow region	15,000,000
Do.	Neryungri Basin	Sakha (Yakutiya) Republic	15,000,000
Do.	Pechora Basin	Komi Republic	30,000,000
Do.	South Yakutia Basin	Sakha (Yakutiya) Republic	17,000,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 [1] [2] [3]

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies	Location	Annual capacity [e]
RUSSIA--Continued				
Cobalt:		Noril'sk Nickel	Noril'sk, Kola Peninsula	4,000
Do.		Rezh, Ufaleynikel, and Yuzhuralnikel enterprises	South Ural'skiye Gory	4,000
Do.		Tuva cobalt	Khovu-Aksy in Tyva	NA
Copper:				
Cu content of concentrate		Buribai enterprise	Buribay region	5,000
Do.		Gai complex	Gai region	40,000
Do.		Kirovgrad complex	Kirovgrad region	12,000
Do.		Krasnoural'skiy complex	Krasnoural'skiy region	12,000
Do.		Noril'sk complex	Noril'sk region	400,000
Do.		Sredneuiralsk complex	Ekatrinenburg region	12,000
Do.		Uchali complex	Uchalinskiy Rayon	40,000
Do.		Urap complex	Stavropol'skiy Kray	7,000
Metal		Kirovgrad (smelting)	Kirovgrad	150,000
Do.		Krasnoural'skiy (smelting)	Krasnoural'skiy	60,000
Do.		Kyshtym (refining)	Kyshtym	70,000
Do.		Mednogorsk (smelting)	Mednogorsk	40,000
Do.		Noril'sk (smelting and refining)	Nori'lsk	500,000
Do.		Psysh (refining)	Psysh	350,000
Do.		Severonikel (smelting)	Monchegorsk	20,000
Do.		Sredneuiralsk (smelting)	Revda	140,000
Diamonds:				
Gem	thousand carats	Almazy Rossii-Sakha Association (ALROSA)	Aykhal, Mirnyy, Udachnaya areas of Sakha (Yakutiya) Republic	12,000
Industrial	do.	do.	do.	12,000
Feldspar, deposits		Lupikko	Karelia	NA
Do.		Kheto-Lanbino	do.	NA
Ferroalloys		Kosaya Gora iron works	Kosaya, Gora	200,000
Do.		Kuznetsk ferroalloy plant	Novokuznetsk	400,000
Do.		Lipetsk iron and steel works	Lipetskaya Oblast'	NA
Do.		Serov ferroalloy plant	Serov	NA
Do.		Tulachermet Scientific and Industrial Association	Tula	NA
Do.		Chelyabinsk electrometallurgical plant	Chelyabinskaya Oblast'	450,000
Do.		Chusovoy iron and steel plant	Chusovoy	NA
Do.		Klyuchevsk ferroalloy plant	Dvurechensk	160,000
Fluorspar		Abagaytuy	Transbaikalia	NA
Do.		Kalanguy	do.	NA
Do.		Kyakhtinsky	do.	NA
Do.		Usugli	do.	NA
Do.		Yaroslavsky	Far East	NA
Gold	kilograms	Mining regions: Yakut-Sakha Buryat Magadan Krasnoyarsk Maritime Tuva	Located at: Sakha (Yakutiya) Republic Buryatiya Republic Magadanskaya Oblast' Krasnoyarskiy Kray Maritime territory Tyva	200,000 [4]
Iron ore		Kursk Magnetic Anomaly (KMA), containing the following enterprises: Mikhailovka Lebedi and Stoilo	Located at: Zheleznogorsk Gubkin	50,000,000 [4]
Do.		Northwest, containing the following enterprises: Olenegorsk Kostomuksha Kovdor	Located at: Olenegorsk Kostomuksha Kola Peninsula	22,000,000 [4]

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Iron ore--Continued:	Siberia, containing the following enterprises:	Located at:	18,000,000 4/
	East:		
	Korshunovo	Zheleznogorsk	
	Rudnogorsk	Rudnogorsk	
	West:		
	Abakan	Abaza	
	Sheregesh	Sheregesh	
	Tashtagol	Tashtagol	
	Teya	Vershina Tei	
Do.	Urals, containing the following enterprises:	Located at:	22,000,000 4/
	Akkermanovka	Novotroitsk	
	Bakal	Bakal	
	Goroblagodat	Kushva	
	Kachkanar	Kachkanar	
	Magnitogorsk	Magnitogorsk	
	Peshchanka	Rudnichnyy	
Lead-zinc, recoverable content of ore:			
Lead, recoverable Pb content of ore	Atay mining and benefication complex	Altay mountains region, South Siberia	2,000
Do.	Dalpolymetal mining and benefication complex	Maritime territory	20,000
Do.	Nerchinsk polymetallic complex	Chitinskaya Oblast'	7,000
Do.	Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	5,000
Do.	Salair mining and benefication complex	Kemerovo Oblast'	2,000
Zinc, recoverable Zn content of ore	Atay mining and benefication complex	Altay mountains region, South Siberia	1,000
Do.	Dalpolymetal mining and benefication complex	Maritime territory	25,000
Do.	Nerchinsk polymetallic complex	Chitinskaya Oblast'	12,500
Do.	Sadon lead-zinc complex	Severnaya Osetiya-Alaniya Republic	14,000
Do.	Salair mining and benefication complex	Kemerovo Oblast'	10,500
Lead, metal	Dalpolymetal lead smelter	Rudnaya in the Maritime District	20,000
Do.	Elektrozinc lead smelter	Vladikavkaz in North Caucasus	30,000
Magnesite	Satka deposit	Chelyabinskaya Oblast'	3,800,000
Magnesium, metal (for sale)	Avisma plant	Berezniki	22,000
Do.	Solikamsk plant	Solikamsk	21,500
Mica	Aldan	Sakha (Yakutiya) Republic	NA
Do.	Karel	Karelia	NA
Do.	Kovdor	Kola Peninsula	NA
Do.	Mam	Irkutsk complex	NA
Molybdenum	Dzhida tungsten-molybdenum mine	West Transbaikalia	NA
Do.	Sorsk molybdenum mining enterprise	Sorsk region	NA
Do.	Tyrnyauz tungsten-molybdenum mine	North Caucasus	NA
Do.	Shakhtaminskoye molybdenum mining enterprise	Chitinskaya Oblast'	NA
Natural gas million cubic meters	Komi Republic	Komi Republic	8,000
Do. do.	Noril'sk area	Noril'sk area	5,500
Do. do.	North Caucasus	North Caucasus	6,000
Do. do.	Sakhalin	Far East	2,000
Do. do.	Tomsk Oblast	West Siberia	500
Do. do.	Tyumen Oblast including:	do.	575,000
	Medvezhye field		(75,000)
	Urengoi field		(300,000)
	Vyrngapur field		(17,000)
	Yamburg field		(170,000)
Do. do.	Urals	Ural'skiye Gory	45,000
Do. do.	Volga	Volga region	6,000
Do. do.	Yakut-Sakha	Sakha (Yakutiya) Republic	1,500
Nepheline syenite	Apatite complex	Kola Pennisula	1,500,000
Do.	Kiya-Shaltyr Mine	Goryachegorsk region, east Siberia	NA
Nickel:			
Ni in ore	Noril'sk Nickel Association	Noril'sk region, Kola Peninsula	300,000
Do.	Yuzhuralnikel company and Ufaleynikel Company	South Ural'skiye Gory	20,000
Metal:			
Smelting	Noril'sk Nickel Association	Noril'sk	160,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Nickel--Continued:			
Metal--Continued:			
Smelting--Continued:	Noril'sk Nickel Association	Pechenga	50,000
Do.	do.	Monchegorsk	50,000
Refining	do.	do.	100,000
Do.	do.	do.	140,000
Ni products and Ni in FeNi	Rezh, Ufaleynikel, Yuzhuralnikel enterprises	South Ural'skiye Gory	65,000
Oil shale	Leningradslanets Association	Slantsy region	5,000,000
Petroleum	European Russia, Astrakhan	North Caspian Sea basin	700,000
Do.	European Russia, Bashkortostan	Ural'skiye Gory	28,000,000
Do.	European Russia, Checheno-Ingush Republic	Southern Caucasus	4,500,000
Do.	European Russia, Dagestan	North Caucasus	700,000
Do.	European Russia, Kaliningrad Oblast	Baltic coast	1,800,000
Do.	European Russia, Komi Republic	Northwest	15,000,000
Do.	European Russia, Krasnodar Kray	North Caucasus	2,000,000
Do.	European Russia, Orenburg Oblast	Ural'skiye Gory	13,000,000
Do.	European Russia, Perm Oblast	do.	12,000,000
Do.	European Russia, Samara	Volga region	16,000,000
Do.	European Russia, Saratov Oblast	do.	1,500,000
Do.	European Russia, Stavropol Kray	North Caucasus	2,000,000
Do.	European Russia, Tatarstan	Volga region	40,000,000
Do.	European Russia, Udmurt Republic	Ural'skiye Gory	9,000,000
Do.	East Siberia, Tomsk Oblast	Tomskaya Oblast'	11,000,000
Do. thousand tons	West Siberia, Tyumen Oblast:	Tyumenskaya Oblast'	300,000
	Kogolym field		(34,000)
	Krasnoleninskiy field		(12,000)
	Langepas field		(30,000)
	Megion field		(18,000)
	Nizhnevartovsk field		(70,000)
	Noyabrsk field		(37,000)
	Purneftegaz field		(12,000)
	Surgat field		(48,000)
	Uray field		(8,000)
	Varegan field		(10,000)
Do.	Sakhalin Island	Sakhalin Island	2,500,000
Phosphate rock	Kingisepp complex	Leningradskaya Oblast'	NA
Do.	Lopatino, Yegorevsk deposits	Moscow Oblast'	NA
Do.	Polpinskoye deposit	Bryanskaya Oblast'	NA
Do.	Verkhnekamsk deposit	Ural'skiye Gory	NA
Phosphate rock, apatite concentrate	Khibiny Apatit Association	Kola Peninsula	20,000,000
Do.	Kovdor iron mining complex	do.	700,000
Platinum-group metals:			
Ore	Nori'lsk Nickel Association	Noril'sk region	135
Metals	Krasnoyarsk refinery	Krasnoyarskiy Kray	NA
Potash, K_2O equivalent	Uralkaliy	Verkhnekamsk deposit	3,000,000
Do.	Silvinit	Solikamsk-Berezniki regions of Ural'skiye Gory	2,000,000
Silver	Dukat Mine, cobyproduct and byproduct of gold and nonferrous metals mining	Magadanskaya Oblast'	1,000
Soda ash	Achinsk plant	East Siberia	595
Do.	Berezniki plant	Ural'skiye Gory	1,080
Do.	Pikalevo plant	Leningradskaya Oblast'	200
Do.	Sterlitamak plant	Sterlitamak	2,135
Do.	Volkhov plant	Leningradskaya Oblast'	20
Steel, crude	Amurstal	Komsomol'sk-na-Amure	1,600,000
Do.	Asha	Asha	450,000
Do.	Beloretsk	Bashkirskoye	380,000
Do.	Chusovoy	Chusovoy	570,000
Do.	Elektrostal	Moscow	314,000
Do.	Gorky	Nizhniy Novgorod	78,000
Do.	Gur'yevsk	Gur'yevsk	160,000
Do.	Karaganda	Karaganda	6,300,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Steel, crude--Continued:	Lipetsk	Lipetskaya Oblast'	9,900,000
Do.	Lys'va	Lys'va	350,000
Do.	Magnitogorsk	Magnitogorsk	16,200,000
Do.	Mechel (Chelyabinsk)	Chelyabinskaya Oblast'	7,000,000
Do.	Nizhniy Tagil	Nizhniy Tagil	8,000,000
Do.	Nizhniy Sergi	Nizhniye Sergi	300,000
Do.	Nosta (Orsk-Kahlilovo)	Novotroitsk in Orenburgskaya Oblast'	4,600,000
Do.	Novosibirsk	Novosibirskaya Oblast'	1,100,000
Do.	Omutninsk	Omutninsk	210,000
Do.	Oskol Electric Steel	Staryy Oskol	1,450,000
Do.	Petrovsk-Zabaykal'skiy	Petrovsk-Zabaykal'skiy	426,000
Do.	Revda	Revda	281,000
Do.	Salda	Sverdlovskaya Oblast'	1,900
Do.	Serov A.K.	Serov	1,000,000
Do.	Serp i Molot	Moscow	70,000
Do.	Severskiy	Polevskoy in Sverdlovskaya Oblast'	825,000
Do.	Severstal (Cherepovets)	Cherepovets	14,000,000
Do.	Sibelektrostal	Krasnoyarskiy Kray	110,000
Do.	Sulin	Sulin	280,000
Do.	Taganrog	Taganrog	925,000
Do.	Tulachermet-Scientific and Industrial Association	Tula	18,400
Do.	Verkh-Isetskiy	Ekatrinenburg	132,000
Do.	Volgograd	Volgogradskaya Oblast'	2,000,000
Do.	Vyksa	Vyksa	540,000
Do.	West Siberian	Novokuznetsk	6,900,000
Do.	Zlatoust	Zlatoust in Chelyabinskaya Oblast'	1,200,000
Do.	Zuznetsk	Novokuznetsk	4,700,000
Talc	Onotsk deposit	Irkutskaya Oblast'	NA
Do.	Kirgiteysk deposit	Krasnoyarskiy Kray	NA
Do.	Miass deposit	Chelyabinskaya Oblast'	NA
Do.	Shabrovsk deposit	Sverdlovskaya Oblast'	NA
Tin	Khinganskoye olovo mining and beneficiation complex	Khabarovskiy Kray	NA
Do.	Solnechnyy mining and beneficiation complex	do.	NA
Do.	Iultin mining and beneficiation complex	Magadanskaya Oblast'	NA
Do.	Khrustalnyy mining and beneficiation complex	Maritime territory	NA
Do.	Deputatskolovo mining and beneficiation complex	Sakha (Yakutiya) Republic	NA
Do.	Pevek mining and beneficiation complex	Magadanskaya Oblast'	NA
Do.	Novosibirsk smelter	Novosibirskaya Oblast'	NA
Do.	Podol'sk smelter	Podol'sk	NA
Do.	Ryazan smelter	Ryazanskaya Oblast'	NA
Titanium, metal	Berezniki plant	Berezniki	40,000
Do.	Moscow plant	Moscow	NA
Do.	Podol'sk plant	Podol'sk	NA
Tungsten:			
W content of concentrates	Antonovogorsk	East Transbaikalia	NA
Do.	Balkan	Northeast of Magnitogorsk, Ural'skiye Gory	NA
Do.	Belukha	East Transbaikalia	NA
Do.	Bom-Grokhom	West Transbaikalia	NA
Do.	Dzhida	do.	NA
Do.	Iultin	Magadanskaya Oblast'	NA
Do.	Lermontov	Maritime territory	NA
Do.	Solnechnyy	Southern Khabarovskiy Kray	NA
Do.	Tyrnyauz	North Caucasus	NA
Do.	Promorye	Maritime territory	NA
Metal	Nalchik plant	Caucasus	NA
Uranium, U content	Priargunskiy mining and chemical enterprise	Krasnokamensk	3,000
Vanadium:			
Ore	Kachkanar iron mining complex	Ural'skiye Gory	NA
Metallurgical processing facilities	Chusovoy and Nizhniy Tagil plants	do.	17,000

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
RUSSIA--Continued			
Zinc:			
Zn content of ore	Bashkir copper-zinc complex	Sibai in southern Ural'skiye Gory	5,000
Do.	Buribai copper-zinc mining complex	Buribai in southern Ural'skiye Gory	1,500
Do.	Gai copper-zinc mining and beneficiation complex	Gai in southern Ural'skiye Gory	25,000
Do.	Kirovgrad copper enterprise	Kirovgrad in central Ural'skiye Gory	1,200
Do.	Sredneuralsk copper complex	Revda in central Ural'skiye Gory	5,000
Do.	Uchali copper-zinc mining and beneficiation complex	Uchalinskiy Rayon in southern Ural'skiye Gory	90,000
Metal	Chelyabinsk electrolytic zinc plant	Chelyabinskaya Oblast'	146,000
Do.	Elektrozink plant	Vladikavkaz in North Caucasus	100,000
TAJIKISTAN			
Aluminum	Tajik aluminum plant (TadAZ)	Tursunzade	520,000
Antimony	Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	2,000
Do.	Isfara hydrometallurgical plant	Isfara	500
Bismuth	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	25
Do.	Isfara hydrometallurgical plant	Isfara	500
Coal	do.	do.	300,000
Do.	Shurabsk brown coal	Shurab region	NA
Do.	Fan-Yagnob hard coal deposits	Pyandzh region	50,000
Copper	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	NA
Fluorspar, concentrate	Takob mining and beneficiation complex	Takob and Krasnye Kholmy deposits	60,000
Gold kilograms	Tajikzoloto mining-beneficiation complex, Pamir Artel	Darvazy, Rankul placer deposits, placers in central and southern parts of country	5,000
Do. do.	Zeravshan Gold Co.	Jilau and Taror deposits	2,500
Do. do.	Darvaz joint venture	Yakhsu field	2,000
Do. do.	Aprelevka joint venture	Aprelevka deposit	200
Do. do.	Vostokredmet refinery	Chkalovsk	NA
Lead	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	2,500
Mercury	Anzob mining and beneficiation complex	Dzhizhikrutskoye deposit	150
Natural gas and petroleum thousand cubic meters	Sixteen oil-gas deposits under exploration that include Ravatskoye, Ayritanskoye, and Madaniyatskoye	Fergana depression	200,000 4/
Do. do.	Shaambary, Beshtentyakskoye, Kichik-Belskoye, and Uzunkhorskoye	Southern Tajik depression	200,000 4/
Silver	Adrasman mining and beneficiation complex	Bolshoy-Kanimansur deposit	NA
Vanadium, pentoxide	Vostokredmet plant	Chkalovsk	350,000
Uranium, U content	Adrasman, Maylisu, Taboshar, Usugai deposits	Northern Tajikistan	NA
Do.	Vostokredmet plant	Chkalovsk	NA
Zinc	Leninabad mining and beneficiation complex	Yuzhno-Yangikanskiy deposit	NA
TURKMENISTAN			
Ammonia thousand tons	Maryzoat Association	Mary region	400,000 9/
Bromine and iodine:			
Bromine	Cheleken plant	Cheleken region	4,740 9/
Do.	Nebitdag plant	Vyshka, Stantsiya	2,370 9/
Iodine	Cheleken plant	Cheleken region	355 9/
Do.	Nebitdag plant	Vyshka, Stantsiya	255
Cement	Buzmeyin cement plant	Buzmeyin	1,000,000 9/
Clay, bentonite	Oglanly Mine	Oglanly region	100,000 9/
Gypsum	IA Turkmenmineral	Mukry, Tagorin deposits	300,000 9/
Do.	Wastes from Gaourdak sulfur deposit	Gaurdak, Gora	400,000 9
Natural gas and petroleum:			
Natural gas million cubic meters	Achakskoye, Gygyrlinskoye, West Shatlykskiye, North and South Naipskiye, Daulatabad-Donmezskoye	Onshore in eastern and southwestern parts of country and offshore in Caspian Sea	90,000
Petroleum:			
Crude	Barsa-Gelmesskoye, Burunskoye, Cheleken, Gograndagskoye, Kamyshldzhinskoye, Korturtepinskoye, Kum Dag, Kuydzhikskoye, Okaremskoye	Onshore in southwestern part of country and offshore in the Caspian Sea	5,500,000 4/
Refined	Chardzhouskiy Rayon refinery	Chardzhouskiy Rayon	6,000,000
Do.	Turkmenbashi refinery	Turkmenbashi	5,000,000

See footnotes at end of table.

TABLE 2--Continued

COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
TAJIKISTAN--Continued			
Sodium sulfate	Karabogazsulfate Association	Bekdash	400,000 9/
Sulfur	IA Turkmenmineral	Gaurdak, Gora deposit	340,000 9/
UKRAINE			
Alumina	Mykolayiv refinery	Mykolayivs'ka Oblast'	1,200,000
Do.	Zaporozh'ye (Dneprovsk) refinery	Zaporiz'ka Oblast'	245,000
Aluminum, primary	Zaporozh'ye (Dneprovsk) smelter	do.	120,000
Coal:			
Hard thousand tons	Donets coal basin with about 225 mines produces more than 90% of Ukraine's coal	Donets'ka, Dnipropetrovs'ka, Luhans'ka Oblasts'	130,000 4/
Do.	Lviv-Volynskiy Basin produces remainder from 18 mines	Western Ukraine	6,000,000 4/
Brown	Dneprovskoye Basin	Central Ukraine	7,000,000
Ferroalloys:			
Ferrochrome	Zaporozh'ye plant	Zaporiz'ka Oblast'	NA
Ferromanganese	do.	do.	NA
Do.	Nikopol' ferroalloys plant	Nikopol'	250,000
Ferrosilicon	do.	do.	200,000
Do.	Stakhanov plant	Luhans'ka Oblast'	NA
Silicomanganese	do.	do.	1,200,000
Do.	Zaporozh'ye plant	Zaporiz'ka Oblast'	160,000
Graphite	Zavalyevskiy graphite complex	Zavalyevskiy deposit	40,000
Iron ore:			
Underground mining	Krivbassruda production association with 16 mines	Kryvyy Rih Basin	15,000,000
Do.	Eksplutatsionnaya Mine of the Zaporizhzhskiy iron ore complex	do.	3,500,000
Open pit mining	Yuzhniy, Novokrivorozhskiy, Tsentralnyy, Severnyy, Inguletskiy, Poltaviskiy, and Kamysh-Burunskiy mining and beneficiation complexes	do.	90,000,000 4/
Kaolin	Prosyanovskoye mining and beneficiation complex	Dnipropetrovs'ka Oblast'	NA
Lead, secondary	Ukrtsink plant	Kostyantynivka	70,000
Magnesium	Zaporozh'ye plant	Zaporiz'ka Oblast'	10,000
Do.	Magnii concern	Kalush	18,000
Manganese:			
Ore, marketable	Mining and beneficiation complexes: Ordzhonikdze, Marganets Tavricheskiy (under development)	Basins: Nikopol' Bol'shoy Tokmak	6,000,000 4/
Metal	Zaporozhye plant	Zaporiz'ka Oblast'	40,000
Sinter	Nikopol' ferroalloys plant	Nikopol	3,000,000
Mercury	Nikitovskiy mining and metallurgical complex	Donets'ka Oblast'	120
Nickel, Ni content in FeNi	Pobuzhhskiy mining and beneficiation complex, comprising three open pit mines and smelter	Pobugskoye Basin	7,000
Potash, K_2O equivalent	Khlorvinil production association, Stebnik potash plant	Pricarpathian region	300,000
Steel, crude	Alchevsk plant	Alchevs'k	4,500,000
Do.	Azovstal plant	Mariupol'	4,000,000
Do.	Dneprospetssstal	Zaporiz'ka Oblast'	1,400,000
Do.	Dneprovsk plant	Dniprodzerzhyns'k	3,850,000
Do.	do.	Dnipropetrovs'ka Oblast'	1,900,000
Do.	Donetsk plant	Donets'ka Oblast'	1,300,000
Do.	Il'yich plant	Mariupol'	7,300,000
Do.	Kirov plant	Makeyevka	4,000,000
Do.	Kryvy Rih plant	Kryvyy Rih	10,650,000
Do.	Zaporozh'ye plant	Zaporiz'ka Oblast'	2,300,000
Sulfur	Sera production association	Rozdol mining complex mines: Rozdol, Soroks, Zdhidalchev deposits; Yarvorov complex mines: Nemirov-Yazov deposits in Lvivs'ka and Kyyivs'ka Oblasts'	1,500,000 4/

See footnotes at end of table.

TABLE 2--Continued

COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
UKRAINE--Continued			
Titanium:			
Ilemenite concentrate	Complexes: Irshanskiy mining and beneficiation complex Verkhnedneprovskiy mining and metallurgical complex	Located at: Irsha Valley Verkhnedneprovsk region	600,000 4/
Rutile	do.	do.	60,000
Metal	Zaporozh'ye plant	Zaporiz'ka Oblast'	6,000
Uranium	Zheltye Vody complex	Northern part of Kryvyy Rih Basin	NA
Zinc, secondary	Ukrtsink plant	Kostyantynivka	25,000
Zirconium:			
Ore, zircon	Verkhnedneprovskiy mining and metallurgical complex	Verkhnedneprovsk region	100,000
Metal and compounds	Pridneprovskiy chemical plant	Dnipropetrovs'ka Oblast'	NA
Do.	Kharkiv physical-technical institute	Kharkivs'ka Oblast'	NA
UZBEKISTAN			
Bismuth	Ustarassay deposit (depleted)	Chotqol and Kuraminskiy Khrebet regions	NA
Clay, kaolin	Angren deposit	Angren region	8,000,000
Coal	Central Asian Coal Association (mining): Angren brown coal deposit	do.	6,000,000
Do.	Baysunskoye and Shargunskoye deposits	Surkhandarya region	1,000,000 4/
Copper:			
Mine output, Cu content	Almalyk mining and metallurgical complex at the Kalmakyr, Sarycheku deposits	Toshkent Wiloyati	100,000
Metal	Almalyk refinery	Olmaliq	130,000
Feldspar	Karichasayskoye and other deposits	Deposits in Samarqand and Toshkent Wiloyati regions; Karakalpakstan (Kara-Kalpakskaya ASSR)	120,000 4/
Fertilizers	Ammophos production association	Olmaliq	NA
Do.	Azot production association	Farghona	NA
Do.	Elektrokhimprom production association	Chirchiq	NA
Do.	Kokand superphosphate plant	Qo'qon	NA
Do.	Naviazot production association	Nawoiy Wiloyati	NA
Do.	Samarkand chemicals plant	Samarqand	NA
Fluorspar	Agata-Chibargata, Aurakhmat, Kengutan, Kyzylbaur, Naugarzan, Nugisken deposits	East of Toshkent Wiloyati	150,000
Gold kilograms	Muruntau deposit	Navoiy region	85,000
Lead, mine output, Pb content	Almalyk mining and metallurgical complex; Altyn-Topkan and Uchkulach deposits	Uchkulach deposit in Toshkent Wiloyati; Altyn-Topkan deposit in Kurama mountain range in Tajikistan (in March 1999, Altyn-Topkan transferred to control of Tajikistan)	40,000 4/
Molybdenum:			
Mine output, Mo content	Almalyk mining and metallurgical complex; Kalmakyr, Sarycheku deposits	Toshkent Wiloyati	900
Metal	Uzbek refinery and hard metals plant	Chirchiq	NA
Natural gas liquids	Mubarek gas processing plant	Muborak	2,500,000
Petroleum and natural gas:	More than 160 oil and gas deposits; 92 deposits under exploration:	Bukhoro-Khiwa, Sukhandarya Oblast, southwest Gissarak, and Ustyurtskiy regions and Farghona Valley	
Natural gas million cubic meters	Major deposits: Gazli, Kandym, Shurtan, Kokdumalak		70,000 4/
Petroleum:			
Crude	Major deposits: Kokdumalak and Mingbulak		9,000,000 4/
Refinery products	Fergana oil refinery	Farghona region	8,800,000
Do.	Bukhara oil refinery	Bukhoro	2,500,000
Steel, crude	Bekabad steel mill	Bekabad	1,100,000
Sulfur	Mubarek gas processing plant complex	Muborak	2,000,000
Tungsten:			
Mine output, W content	Deposits: Koytash deposit Ingichka deposit Ugat deposit	Located at: Northeastern Uzbekistan Zirabulak Mountains Northern Uzbekistan	1,200 4/

See footnotes at end of table.

TABLE 2--Continued
COMMONWEALTH OF INDEPENDENT STATES: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000 1/ 2/ 3/

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location	Annual capacity e/
UZBEKINSTAN--Continued			
ungsten--Continued:			
Metal	Uzbek refractory and hard metals plant	Chirchiq	NA
ranium, U content	Naviazot mining and metallurgical complex	Navoiy region	3,000

Estimated. NA Not available.

Table includes data and information available through October 2001.

Estimated data are rounded to no more than three significant digits.

Many location names have changed since the breakup of the soviet Union. Many enterprises, however, are still named or commonly referred to based on the rmer location name, which accounts for discrepencies in the names of enterprises and that of locations.

Capacity estimates are totals for all enterprises that produce that commodity.

For a listing of production-sharing agreements for oil and gas development, refer to the USACC Investment Guide to Azerbaijan 2001, United States-Azerbaijan hamber of Commerce (USACC), Washington, DC.

Capacity for crude petroleum distillation.

Total peat for fuel use production.

Crude throughput.

Reported figure.

TABLE 3
COMMONWEALTH OF INDEPENDENT STATES: GROSS DOMESTIC PRODUCT AND INDUSTRIAL OUTPUT IN 2000 1/

Country	Gross domestic product	Industrial output
Armenia	106.0	106.4
Azerbaijan	111.4	106.9
Belarus	106.0	108.0
Georgia	101.9	106.1
Kazakhstan	110.5 2/	114.6
Kyrgyzstan	105.0	106.0
Moldova	101.9	102.3
Russia	108.0 3/	109.0
Tajikistan	108.3	110.3
Turkmenistan	NA	NA
Ukraine	106.0	112.9
Uzbekistan	104.2	106.4

NA Not available.

1/ Output as a precentage of those in 1999 in constant prices.

2/ Data for January-September.

3/ Production of output in the basic branches of the economy economy (industrial, agricultural, construction, transportation, and trade).

Source: Voprosy Statistiki [Questions of Statistics], 2001, Ekonomika stran sodruzhestva nezavisimykh gosudarstv v 2000 godu [The economies of the countries of the Commonwealth of Independent States in the year 2000]: Voprosy Statistiki, no. 4, p. 6.

TABLE 4
KAZAKHSTAN: SELECTED EXPORTS AND IMPORTS, BY COMMODITY

(Metric tons unless otherwise specified)

		1999	2000	1999-2000 percentage change
Exports:				
Aluminum oxide and hydroxide		1,159,316	1,356,400	117
To non-CIS countries		--	--	--
To CIS countries		1,159,316	1,356,400	117
Coal		16,150,503	25,679,300	159
To non-CIS countries		189	300	159
To CIS countries		16,150,314	25,679,000	159
Copper, refined and alloys		354,505	393,500	111
To non-CIS countries		354,414	393,400	111
To CIS countries		90	100	111
Ferroalloys		722,479	845,300	117
To non-CIS countries		715,299	836,900	117
To CIS countries		7,179	8,400	117
Ferrous metal, flat roll including tinplate		2,913,125	3,262,700	112
To non-CIS countries		2,801,415	2,969,500	106
To CIS countries		111,738	293,200	262
Iron ore		3,491,438	5,341,900	153
To non-CIS countries		--	--	--
To CIS countries		3,491,438	5,341,900	153
Lead		110,284	155,500	141
To non-CIS countries		89,917	108,800	121
To CIS countries		20,393	46,700	229
Oil:				
Crude and gas condensate		23,668,387	29,348,800	124
To non-CIS countries		16,644,219	21,304,600	128
To CIS countries		7,024,214	8,044,200	115
Oil products		900,089	1,008,100	112
To non-CIS countries		768,087	883,300	115
To CIS countries		132,008	124,800	95
Precious metals	value, thousands	$286,194	$383,500	134
To non-CIS countries	do.	$286,194	$383,500	134
To CIS countries	do.	--	--	--
Zinc, unprocessed		207,321	232,200	112
To non-CIS countries		204,685	227,200	111
To CIS countries		2,604	5,000	192
Imports:				
Coke and semicoke		671,923	698,800	104
From non-CIS countries		26,703	98,800	370
From CIS countries		645,161	600,000	93
Ferrous metal, pipe		116,478	267,900	230
From non-CIS countries		29,177	58,500	201
From CIS countries		87,250	209,400	240
Ferrous metal, rail products		45,942	31,700	69
From non-CIS countries		500	400	80
From CIS countries		45,362	31,300	69
Natural gas	million cubic meters	2,775,132	4,218,200	152
From non-CIS countries	do.	--	--	--
From CIS countries	do.	2,775,132	4,218,200	152
Oil products		611,606	1,180,400	193
From non-CIS countries		31,122	42,700	137
From CIS countries		580,459	1,137,700	196

-- Zero.

TABLE 5
RUSSIA: SELECTED EXPORTS, BY COMMODITY

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 r/	2000
Aluminum, primary		2,619,400	2,710,200	2,795,100	3,127,600	3,184,400
To non-CIS countries		2,617,300	2,706,800	2,790,400	3,119,100	3,173,200
To CIS countries		2,100 r/	3,400	4,700	8,500	11,200
Coal, hard		26,258,900	23,092,900	23,477,700	28,185,200	43,422,800
To non-CIS countries		20,866,100	19,703,200	18,224,200	22,249,100	37,317,000
To CIS countries		5,392,800	3,389,700	5,253,500	5,936,100	6,105,800
Copper, refined		529,600	534,500	550,900	638,800	645,400
To non-CIS countries		527,400	533,600	550,300	636,400	642,400
To CIS countries		2,200	900	600	2,400	3,000
Ferroalloys		285,500	342,600	335,600	413,600	406,100
To non-CIS countries		274,300	334,100	322,300	394,700	381,100
To CIS countries		11,200	8,500	13,300 r/	18,900	25,000
Iron ore and concentrates		11,256,800	11,772,600	13,828,300	11,129,600	19,219,700
To non-CIS countries		7,890,800	8,393,100	10,145,000	7,765,800	9,105,700
To CIS countries		3,366,000	3,379,500	3,683,300 r/	3,363,800	10,114,000
Natural gas	thousand cubic meters	198,514,000	200,858,000	200,618,000	205,354,500	193,849,900
To non-CIS countries	do.	128,028,000	120,871,000	125,044,000	131,066,000	133,810,000
To CIS countries	do.	70,486,000	79,987,000	75,574,000	74,288,500	60,039,900
Nickel		167,200	221,900	214,200	211,200	197,300
To non-CIS countries		166,900	221,600	214,100	210,900	196,800
To CIS countries		300	300 r/	100	300	500
Petroleum, crude		125,952,800	126,846,800	137,107,700	134,917,000	144,518,500
To non-CIS countries		105,376,700	109,775,100	117,934,200	116,131,400	127,632,700
To CIS countries		20,576,100	17,071,700	19,173,500	18,785,600	16,885,800
Petroleum refinery products		57,006,100	61,308,100	53,797,000	56,882,900	61,874,800
To non-CIS countries		54,875,800	59,102,400	51,187,100	53,864,900	58,394,500
To CIS countries		2,130,300 r/	2,205,700	2,609,900	3,018,000	3,480,300
Pig iron		2,109,400	2,455,100	2,540,300	2,927,100	3,695,100
To non-CIS countries		2,043,300	2,397,400	2,451,000	2,794,100	3,554,600
To CIS countries		66,100	57,700	89,300	133,000	140,500

r/ Revised.

TABLE 6
RUSSIA: EXTRACTION OF COAL BY ENTERPRISES OF THE MINISTRY OF ENERGY IN 2000

(Metric tons)

	1999	2000	1999-2000 percentage change 1/
Coal extraction by enterprises of Minenegro:			
By economic regions:			
Central	899,000	762,000	(15.2)
Far East	29,210,000	28,125,000	(3.7)
North Caucasus	10,075,000	9,709,000	(3.6)
Northern	19,594,000	18,818,000	(4.0)
Siberian:			
Eastern	70,012,000	75,538,000	7.9
Western	109,017,000	114,100,000	4.7
Total	179,029,000	189,638,000	5.9 2/
Urals	7,512,000	6,805,000	(9.4)
Grand total	246,319,000	253,857,000	3.1 2/
By basins:			
Donetsk	10,074,000	9,709,000	(3.6)
Kansk-Achinsk	19,204,000	18,403,000	(4.2)
Kuznetskzy	108,511,000	113,640,000	4.7
Pechora	36,428,000	39,863,000	9.4
Total	174,217,000	181,615,000	4.2 2/
Coal extracted:			
From underground mines	88,373,000	89,191,000	0.9
From open pits	157,942,000	164,666,000	4.3

See footnotes at end of table.

TABLE 6--Continued
RUSSIA: EXTRACTION OF COAL AS ENTERPRISES OF THE MINISTRY OF ENERGY IN 2000

(Metric tons)

	1999	2000	1999-2000 percentage change 1/
Extraction of coking coal, by basins:			
Donetsk	207,000	216,000	4.3
Kansk	43,710,100	45,875,300	5.0
Pechora	8,494,700	8,877,800	4.5
South Yakutsk	4,116,200	4,920,400	19.5
Total	56,528,000	59,889,500	5.9 2/

1/ Percentage in parentheses indicate a decrease.

2/ Not an accumulated summation.

Source: Ugol' [Coal], 2001, Kratkiye itogi raboty ugol'noy promyshlennosti Rossil za 2000 god [Summary results of the work of the Russian coal industries in 2000]: Ugol', no. 3, p. 55-59.

TABLE 7
RUSSIA: PROGNOSTICATED METHANE RESOURCES IN COAL SEAMS AT MAJOR BASINS AND DEPOSITS

(Million cubic meters)

	Total resources	At fields of operating mines
Kuznetsk	13,085,000	211,500
Pechora	1,942,000	26,400
Donetsk	1,178,000	495,000
Of which, eastern Russian section	(97,000)	(2,200)
Burenskiy	312,000	--
Apsatskiy	55,000	55,000
Sakhalin	48,000	4,200
Partizanskiy	22,000	6,800
Total 1/	16,642,000	798,900

-- Zero.

1/ Total includes Russian and non-Russian sections of the Donetsk Basin.

Source: Ugol' [Coal], 2001, Ugol'naya promyshlennosti Rossil na poroge: v nache XXI veka [The Russian coal industry at the threshold and in the beginning of the 21st century]: Ugol', no. 2, p. 16-20.

THE MINERAL INDUSTRIES OF

THE CZECH REPUBLIC, HUNGARY, POLAND, AND SLOVAKIA

By Walter G. Steblez

The Central European transitional economy countries of the zech Republic, Hungary, Poland, and Slovakia represent one f the more economically dynamic regions in the field of former entrally planned economy countries of Europe and Central urasia. As founding members of the Central European Free rade Agreement (CEFTA) (Bulgaria, Romania, and Slovenia oined in 1999), these countries have continued to implement olicies designed to harmonize standards and trade with a view o integrating themselves fully into the European Union, as they lready had done in the European security sphere through nembership in the North Atlantic Treaty Organization. To ccommodate new standards, the development of new ommercial infrastructure in the region has warranted continued ocus on the region's cement, industrial minerals, and steel ndustries. The trend of large-scale foreign investment in the ement and associated quarrying industries in the Central European region, which emerged during the 1990s, became more clearly discernible in the region's iron and steel sectors during 2000.

CZECH REPUBLIC

The Czech Republic was an important Central European producer of heavy industrial goods manufactured by the country's toolmaking, machine building, and chemical ndustries. Steelmaking, the mining and processing of industrial minerals, and construction materials production continued to be of regional as well as of domestic importance.

In 2000, the country's economy showed improvement as the GDP increased by about 2.8% compared with that of 1999 (U.S. Central Intelligence Agency, 2001). Industrial production increased by 7.6% and comprised about 42% of the total value of the GDP. According to GEOFOND (2000, p. 17), which was the country's leading mineral information agency, the mining and processing sector's share of the GDP in 2000 declined to 1.5% from 3.7% in 1993.

The Government continued economic development policies whose aim has been to integrate the country into the EU. The country's membership in the World Bank for Reconstruction and Development, the International Monetary Fund, and the Organization for Economic Cooperation and Development (OECD) as well as the World Trade Organization and participation in the General Agreement on Tariffs and Trade were largely an outcome of the Czech Republic's full orientation to a Western European political system and market economy.

Three constituent acts comprise the country's mining law, which forms the foundation of the Government's mining and other mineral-related policies—Act No. 44/1988 Coll. on protection and use of mineral resources (the Mining Act), as amended; the Czech National Council Act No. 61/1988 Coll. on mining activity, explosives, and state mining administration (Authority/Sedenka), as amended; and the Czech National Council Act No. 62/1988 Coll. on geological works, as amended. The Mining Act classifies minerals into either "reserved" or "unreserved" categories. The "reserved" category refers to mineral deposits that, apart from market considerations, were determined to be necessary for the development of the national economy (Luks, 1997). Other provisions in the mining law address issues of licensing and Federal and regional compliance with environmental regulations during the exploration and exploitation of a mineral deposit and the reclamation of mined-out areas.

To meet the needs of a developing market economy, major changes in the Czech Republic's environmental policies were enacted in 1997. On the basis of environmental principles that were approved by the Government in 1995, the new policy was officially formulated in the environmental law of 1997, Act No. 125/1997. Also, four of the six enabling provisions of the new law were formally adopted at the same time as the new law on January 1, 1998. The environmental law focused on reducing the volume of waste, discreet collection of waste by category, and recycling. The law has adopted the main provision in EU and OECD regulations as well as those of the Basle Convention. The new catalogue of wastes is compatible with the European Catalogue of Wastes of the EU.

The Czech Republic's metals sector produced a broad range of base metals and semimanufactures from imported primary raw materials (ores and concentrates) and secondary materials (scrap). The metals sector generally represented approximately 10% of the value of the country's industrial production during the later part of the 1990s. The iron and steel branch alone has generated between 8% and 9% of the industrial output. Employment in the metals sector accounted for about 10% of the total industrial employment; the iron and steel sector accounted for about 8% of the country's industrial workforce. In recent years, the iron and steel industry's material costs have constituted about 60% of total production costs of the metals sector, and labor costs have amounted to about 12% (Ambroz, 1997).

The iron and steel branch also accounted for more than 75% of the sales of the country's metals sector, which comprised 12 enterprises that produced pig iron, crude steel, rolled materials, and steel and cast iron pipes, which included closed welded pipe steel and various welded semimanufactures. The nonferrous metals branch, which comprised nine major enterprises, produced finished and semifinished commodities of nonalloyed and alloyed aluminum, copper, and lead . The nonferrous metals branch has relied entirely on domestic and imported scrap and on imports of ore and concentrate and semimanufactured products as its raw materials base. Overall, scrap usually accounts for 40% to 50% of all new crude metal production (Urban, 1998).

Although gold mining in some parts of the Czech Republic remains prospective, economic resources of most metals have been depleted. According to GEOFOND (2001, p. 19), most of the country's metallic mineral deposits as of December 31, 2000, were not economic. Gold-bearing and tin-tungsten ores were among the exceptions.

The Czech Republic had eight deposits of iron ore that were no longer worked because they had been determined to be uneconomic. All the raw materials consumed by the country's steel industry, iron ore and concentrate and pellets and agglomerate were imported. In 2000, the Czech Republic imported about 7 Mt of iron ore and concentrate, mainly from Ukraine and Russia, that accounted for about 80% and 19%, respectively, of the Czech Republic's total imports. Net imports of pig iron amounted to 33,000 t, and net exports of iron and steel scrap amounted to more than 800,000 t (GEOFOND, 2001, p. 22). Manganese, which is of prime importance to the steel industry, was obtained entirely from imports of ores and concentrates (10,436 t, Ukraine, 63%), ferromanganese (17,569 t, Slovakia, 50%), and ferrosilicomanganese (22,300 t, Slovakia 53%) (GEOFOND, 2001, p. 26). The steel industry operated eight steel plants with a collective capacity to produce almost 11 Mt/yr of steel. The main steel producers were Nova Hut s.p. (Ostrava) (NH), Zelezarne Vitcovice, Trinecke Zelezarny (TZ), and Poldi United Steel Works and accounted for more than 95% of total production capacity.

The restructuring and privatization of the Czech Republic's entire iron and steel sector were among the major issues during 2000. The reorganization of the steel industry was based on a study commissioned by the Government, which was completed by a group headed by the Czech and Slovak Steel Federation in October 1999. The Government's plan to implement a first phase restructuring program included a 20% reduction of steel production capacity that would result in the closure of 17 furnaces, 10 of which were electric arc furnaces, and 17 rolling mills. The closure cost was estimated to be about $96.7 million, and the total cost of the restructuring plan would cost about $2 billion. The country's three large integrated steelworks, TZ, NH, and Vitcovice, which accounted for more than 90% of to the Czech Republic's total steel output, also had been pursuing individual development plans to be able to compete in the EU (Walawalker, 2000). In early 2000, the three major steel producers signed a letter of agreement to assist the Government with its restructuring aims for the steel industry (Metal Bulletin, 2000a).

In 2000, of the three integrated steel mills, only TZ was fully privatized. In prior years, the company's modernization efforts raised continuous casting operations to nearly 100% of the total output. A second modernization phase was planned to start in October and included a walking beam furnace (180 metric tor per hour) and a continuous roughing mill that would be suppl by Danieli of Italy (Walawalker, 2000). The new equipment and assemblies would allow TZ to increase billet size and coi weight. Major foreign investment in TZ centered on negotiations between TZ owner Moravia Steel and Commerci Metals Co. of the United States and involved the sale of about 11% of TZ stock (Metal Bulletin, 2000f).

The Czech Republic's largest steel mill, NH, continued wor on increasing the output of flat-rolled products. The facility expansion project, which was started in 1997, was planned for completion by yearend with the construction of a 1 Mt/yr slab caster and a reversing hot-strip mill. The new facilities would raise flat-rolled production from 23% to 43% of total output. Continuous casting also was increased to 100% by yearend (Walawalker, 2000). The Government remained a major shareholder in NH with 49% of the stock and slightly more tha 18% was owned by Credit Suisse of Boston. Investment interest in NH during the year was exemplified by Central European Consultants of the United Kingdom, which bought a 1% stake in the company that included an option to further acquire a 15% of the stock (Metal Bulletin, 2000d).

Vitcovice (more than 65%-owned by the Government's National Property Fund) began 2000 with debts that amounted to about $350 million; this and other financial difficulties resulted in plans to alter the company's structure. With the concurrence of the Vitcovice's creditors, the Government outlined a major restructuring program for the company and allowed debt repayment to be postponed for 1 year. The restructuring plan would divide Vitcovice into four divisions—steelmaking, energy, and two machine-building units. Other noncore businesses also would be sold off, thereb resulting in a workforce reduction of between 3,000 and 5,000 employees out of a total workforce of more than 11,000 employees (Metal Bulletin, 2000c; Walawalker, 2000).

In early 2000, the Poldi I steel plant in Kladno was acquired by Scholz-Stahl Centrum Ost SRO (a subsidiary of the Scholz AG group of Germany. Operations at Poldi I were restarted after a hiatus of several years. The initial output was limited to about 12,000 t/yr of high-speed and tool steels mainly for export. Expansion plans, however, would seek to raise output to about 24,000 t/yr. Poldi I operated two 7-t and one 25-t electric arc furnaces to process steel scrap supplied by Scholz AG MB (Metal Bulletin, 2000e; Walawalker, 2000, p. 47). Th facilities at the Poldi II steel plant in nearby Drin continued to be leased by TZ, which operated a 100,000-t/yr rolling mill at the site. In the past, Poldi I and Poldi II formed the Poldi steelworks in Kladno.

The Czech Republic imported copper to meet all of its industrial needs. From 1998 to 2000, copper imports remained steady and averaged more than 14,300 t. In 2000, the Czech Republic's imports of refined copper and copper alloys amounted to 14,223 t; Poland, Austria, and Germany supplied 43%, 29.8%, and 24.9% of total imports, respectively. From 1996 to 2000, the Czech Republic apparently was a net exporter of copper scrap; exports ranged from about 24,600 t to 34,000 t (GEOFOND, 2001, p. 30-31).

Lead and zinc have not been mined in the Czech Republic for at least 6 years. The number of registered deposits declined to

11 in 2000 from 27 in 1995; none, however, were under exploitation during this period (GEOFOND, 2001, p. 35, 39). The primary source of domestic lead comes from recycled batteries collected and processed by the Czech Republic's sole recycler of secondary lead, Kovohute Pribram. Production of secondary lead in 2000 was expected to reach 29,000 t, compared with 24,000 t produced in 1999 (Metal Bulletin, 2000b). According to Kovohute Pribram spokespersons, batteries have accounted for 80% of the company's lead raw material supply. The spokespersons also indicated that the purchase of scrap that contains precious metals will have risen by 100% in 2000 compared with that of 1999, although the actual quantity of the scrap was not revealed (GEOFOND, 2000, p. 23-36). In 2000, Germany supplied about 72% of the 53,000 t of unwrought lead imported by the Czech Republic. Net imports of lead for consumption amounted to about 40,200 t. Similarly, imports of unwrought zinc in 2000 exceeded 27,700 t; this was an increase of about 30% compared with those of 1999. Poland and Germany, which were the major zinc exporters to the Czech Republic, accounted for about 58% and 12%, respectively, of the total zinc imports (GEOFOND, 2001, p. 35, 39).

The energy policy of the Czech Republic has promoted the following aims: the decontrol of prices for energy; the denationalization, rationalization, and restructuring of the energy industry sector; an increase in the level of conservation, health and safety, and pollution control in the energy sector; the diversification of electricity, natural gas, and petroleum supply; and the raising of the efficiency of domestic production of fossil fuels.

To help make its governmental and economic structures more compatible with those of the EU, the Government would proceed with harmonizing the country's energy sector's standards with those of the EU. In part, this would reduce the Czech Republic's dependence on such solid fuel as coal and wood from 60% in 1996 to 50% by 2000 and 40% by 2005 (Lynch, 1999, p. 1). The energy sector, especially heat- and electric-power-generating plants, has been the main source of industrial air pollution and has accounted for about 82% of the sulfur dioxide (SO_2), 21% of the nitrous oxide (NO_x), and 55% of total particulates released into the atmosphere. Hard or bituminous coal occurs mainly in the Upper Silesian Basin. Of the resources pertaining to this region, about 15% is in the Czech Republic; the balance of the resources is in Poland. Bituminous coal, or phytokaustobiolite as it is described in the annual Mineral Commodity Summaries of the Czech Republic, has a higher degree of coalification than lower rank coals. Some of the characteristics of Czech bituminous coal include a carbon content of more than 73.4%, less than 50% volatile matter, and a dry calorific (ash-free) value that exceeds 24 megajoules per kilogram (MJ/kg). As of December 31, 2000, the Czech Republic reported total resources of bituminous coal to have amounted to about 16.354 billion metric tons (Gt). Coal output in 2000 remained steady at just more than 17 Mt. Imports that amounted to 1.095 Mt were derived almost exclusively from Poland. About 6 Mt of bituminous coal was exported mainly to Austria, Germany, and Slovakia (GEOFOND, 2001, p. 62, 63).

In addition to hard coal, the Czech Republic distinguishes two types of lower rank coal—brown coal and lignite. Brown coal is distinguished by having a lower level of coalification; that is, with a fixed level of carbon of less than 73.5%, more than 50% volatiles, and a dry (ash-free) calorific value of less than 24 MJ/kg. The vitrinite reflective boundary between hard/bituminous coal and brown coal is lower than 0.5% for brown coal. The boundary between brown coal and lignite, however, is not recognized owing to the inclusion of high-volatile lignite in the brown coal category (GEOFOND, 2001, p. 67). The Czech Republic's brown coal deposits are worked in the northwestern part of the country in the Bohemian brown coal basins. The major brown coal basins are found in Krusnehory Mountains region and cover an area of 1,900 square kilometers (km^2). Coal also is mined in the Cheb, the Sokolov, and the Zitava basins. Total resources of brown coal as of December 31, 2000, amounted to more than 9.652 Gt. Brown coal was used mostly as a fuel in the country's electric power industry; a minor proportion was consumed by the chemicals sector. In 2000, major foreign commerce in brown coal centered on exports of about 3 Mt; Germany (67%) and Slovakia (26%) were the major recipients (GEOFOND, 2001, p. 67, 69).

According to GEOFOND (2001, p. 71), Czech standards for coal describe high-volatile lignite as a variety of brown coal that has undergone the least amount of coalification and that still has xylitic characteristics (fragments of wood, preserved tree trunks, etc.). Its dry calorific value is less than 17 MJ/kg. There is no distinct boundary between brown coal and high-volatile lignite. Lignite is consumed mainly by the electric-power-generating sector; it also is used for heating. The chief deposits occur in the Vienna basin, which extends from Austria to Moravia. Total resources of lignite in the Czech Republic at the end of 2000 amounted to more than 1.029 Gt (GEOFOND, 2001, p. 71).

The Government of the Czech Republic remained the principal source of financing for the coal industry. The main categories of funding are closure of mines, reclamation of lands affected by mining, and health and safety issues. State financing for all branches of coal mining from 1990 to 2000 amounted to 25.4 billion Czech koruny (CZK) (US$1=CZK33) (GEOFOND, 2001, p. 62).

According to GEOFOND (2001, p. 75), the Czech Republic's oil- and gas-bearing/producing area is in the so-called Vienna-Moravia oil-bearing province. The deposits in this province are hosted in a large number of "individual oil-bearing structures and producing horizons..." to a depth of 2,800 m. Sandstones of the Middle and Upper Badenian age are described as hosting the most productive oil deposits. Hrusky has been the largest deposit, but most of the oil at Hrusky has been extracted and the structure serves mainly as an underground gas storage facility. Additionally, another oil-bearing area is in the Moravian region of the Carpathian foredeep, where exploration was being conducted. Petroleum in this region occurs in weathered crystalline Paleozoic rocks. The prevailing type of petroleum is a light, sulfur-free, paraffin to paraffin-napthene oil. The Czech Republic's petroleum resources as of December 31, 2000, amounted to about 37.5 Mt, of which about 11.1 Mt was categorized as economic proven; 13.5 Mt, as economic probable; and about 12.9 Mt, as subeconomic.

In 2000, the Czech Republic imported about 5.8 Mt of petroleum, of which about 4.8 Mt was imported from Russia, and 500,000 t came from Kazakhstan. Total imports of petroleum from the CIS accounted for more than 90% of the country's import needs. Exports during the same period were about 111,000 t (GEOFOND, 2001, p. 76). Natural gas production declined by about 17% from 143 million cubic meters produced in 1999. In 2000, Russia supplied the Czech Republic with about 78% of more than 9.5 billion cubic meters of natural gas imports; about 21% was obtained from Norway (GEOFOND, 2001, p. 80).

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HUNGARY

Hungary produced modest amounts of fossil fuels and industrial minerals and relied heavily on imported mineral raw materials. In 2000, the imports of crude raw materials, which included minerals, increased by 13% compared with those of 1999, and those of mineral fuels and electric power, by 5%. Crude raw material exports rose by 16.2%, and those of mineral fuels and electric power, slightly (0.01%). On balance, however, the combined values of imports of raw materials and fuels exceeded those of exports by almost three times. Net imports of raw materials and fuels showed an increasing trend from 1998 to 2000—rising by 5% in 1999 and by about 27% in 2000 (Hungarian Central Statistical Office, 2000, p. 79). With respect to metals, bauxite mining and refining to alumina and manganese mining remained the only metal mining and processing operations in Hungary. Cement and coal production were the dominant components of the industrial minerals and mineral fuels branches of Hungary's mineral industry.

In 2000, Hungary's GDP increased by 5.5% compared with that of 1999, and the volume of industrial production rose by about 18%. The value of output in constant prices by the mining and processing sector, however, declined by 10% compared with that of 1999 (Hungarian Central Statistical Office, 2001, p. 134). The output of bauxite showed some recovery compared with shortfalls in 1999, with output increasing by about 12%. The production of crude steel exceeded the crude steel output level of 1999 by more than 3%. Cement production increased by more than 12%. Coal output, however, contracted by about 4% (table 3).

Energy consumption remained one of Hungary's main economic concerns because of the country's need to import a substantial share of its fuel requirements. In terms of value, imports of natural and manufactured gas in 2000 exceeded exports by 67 times; those of coal and coke, by almost 6.5 times; and those of petroleum and petroleum products, by 2.4 times (Hungarian Central Statistical Office, 2001, p. 86). Imports generally have constituted between 55% and 57% of total energy availability (measured on a terajoule basis).

Hungary classifies its coals into three categories—hard coal (bituminous), brown coal, and lignite; the latter two are subbituminous. Brown coal and lignite are mined, for the most part, to fuel the country's thermal electric power stations. Lignite is mined by open pit at the Bukkabrany and the Visonta mines; the output from these mines was used entirely at the Matra electric powerplant. The mines and the electric powerplant have been owned by RWE/EVS consortium of Germany since 1995 (Molnar, 1999, 2001).

Hungary's total resources of bauxite were estimated to be about 26 Mt, of which commercial reserves amounted to 16 Mt at an average grade of 50.4% Al_2O_3 and 7% SiO_2. In 2000, Bakonyi Bauxitbanya Kft., which constituted Hungary's bauxite mining industry, produced more than 1 Mt of bauxite at the Fenyofo I and the Halimba III underground mines and the Bicske and the Obarok open pits; the bauxite was refined at the Ajka alumina refinery.

Although Hungary no longer mined copper, past surveys of the deep-lying (900 to 1,100 m) Recsk copper ore body in the Matra mountains discovered between 172 and 175 Mt of copper ore at a grade of 1.12% copper and about 20 Mt of polymetallic ore at a grade of 4.22% lead and 0.92% zinc as well as smaller quantities of gold, molybdenum, and silver. Geologic investigations conducted by the Government determined the area of mineralization to be about 10 km^2. After years of failed effort to attract foreign investment, the exploration shaft and adit at the Recsk copper deposit, which was under care and maintenance, finally was closed, the equipment removed, and the facilities flooded in 1999 (Molnar, 2001). Exploration in the Recsk region, however, continued for gold because 35 Mt of gold-bearing enargite copper ore was delineated with a grade of 1.47 grams per metric ton (g/t) gold. Further exploration in the region was reported during 2000.

The major issue in Hungary's iron and steel sector centered on the viability of DAM-Diósgyőri Acélmüvek Rt (Diósgyör Steelworks Industrial & Trade Shareholding Co.), which was a producer of steel bars and section. DAM (owned by VSZ a.s. of Slovakia) faced bankruptcy and liquidation throughout most of 1999 (Metal Bulletin, 2000a) At yearend 2000, however, VSZ promoted a financial stabilization program for DAM partly through a consortium of Hungarian and foreign customers and by raising the efficiency of the steelworks (Marko, 1999).

In 2000, the viability of DAM remained a major issue in Hungary's steel industry. In early 2000, VSZ, which had controlling interest in DAM, approved a plan to restart operations at the financially ailing DAM following a restructuring plan that would allow the steel producer to meet its financial obligations, especially those to electric power suppliers (Metal Bulletin, 2000c). In 1999, the plant was reported to be operating at less than 50% of capacity; this and mounting debt led VSZ to look for potential buyers. The pending acquisition of VSZ by USX Corp. of the United States in 2000 further complicated DAM's future (Metal Bulletin, 2000d).

Production bottlenecks in the early part of 2000 were reported in the steel industry as railroad workers went on strike in February. The impact of the rail strike was felt to a greater degree at Dunaferr Steelworks, which imported South African iron ore via Costanza in Romania to off-loading terminals on the Danube in Hungary (Metal Bulletin, 2000b).

Hungary produced a broad range of industrial minerals that included aggregates, bentonite, kaolin, and perlite. Such industrial minerals as construction aggregates and cement, continued to play an important role in Hungary's economy, especially in view of their role in the modernization process necessary for the country's infrastructure. Planned highway construction through 2008 would be an important element in this role.

For more extensive coverage of the mineral industry of Hungary see the 1996 and 1998 Minerals Yearbook, Mineral Industries of Europe and Central Eurasia, volume III.

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POLAND

Poland was endowed with significant mineral resources, which included bituminous coal, copper and lead and zinc ores, salt, silver, and sulfur. Poland's reserve bases of copper and sulfur represented about 6% and 9%, respectively, of world totals for these mineral commodities (Edelstein, 2001; Ober, 2001). Resources of coal, salt, and silver also were considered to be of world significance. An inventory of the country's mineral resources for 2000 indicated net gains in geologically documented resources mainly for construction-grade ceramic clays, glass sand, crushed stone, and gravel aggregates, as well as natural gas (table 8).

Poland was the second largest producer of copper in Europe and Central Eurasia in 2000 and remained among the top 10 world producers of copper in terms of mine output (Edelstein, 2001). Poland also continued to be among the world's major producers of silver and sulfur. In Central Eurasia and Europe, the country was a significant producer of lead and zinc and a leading producer of lime, nitrogen (in ammonia), and salt. According to the most recent available data (1997), Poland also accounted for about 3.6% of total world output of bituminous coal (Glowny Urzad Statystyczny, 2000, p. 668).

Poland's economy remained robust in 2000. The gross domestic product (GDP) (in constant prices) rose by about 4.0% compared with that of 1999, which was a slightly smaller increase than that achieved in 1999. The gross output of industry represented about 24% of the GDP, and that of the mining and quarrying sector, which included mineral fuels and processing, accounted for about 6%. Total sales for the year by the mining and quarrying sector (less coal mining) contracted by about 1.5% compared with those of 1999; sales by the coal lignite and peat mining industries during the same period contracted by about 3% (Glowny Urzad Statystyczny, 2001, p. 34, 122-123). The base-metals-producing sector registered about a 10% increase in sales compared with those of 1999, and sales by the industrial minerals sector showed gains of about 7%. Sales by the coke manufacturing and petroleum refining sectors grew by more than 23% compared with those of 1999 (Glowny Urzad Statystyczny, 2001, p. 123).

Poland's production of minerals in 2000 showed mixed results. Major production increases of 19.4% and 3.3% were noted for crude steel and refined copper, respectively. The output of byproduct gold and lead and zinc ore fell by about 25% and 11%, respectively. The output of other metals, such as aluminum and refined lead and zinc, declined. The production of industrial minerals, such as salt and sulfur, increased compared with that of 1999. The production of natural gas, peat, and crude petroleum and refinery products increased compared with that of 1998; coal production, however, fell by almost 6% (table 5).

Poland's trade returns for selected mineral commodities for 1999 (latest year for which data are available) showed a decline in the import of iron ore and concentrate. Imports of aluminum and steel, however, rose compared with those of 1998. Among industrial minerals and mineral fuels, imports of glass, mineral fertilizers, and petroleum increased (table 7). With the exception of steel and steel semimanufactures, exports of major metals rose in 1999. Exports of refined petroleum products for the year increased in contrast to coal and coke and semicoke, which declined. Cement exports fell significantly in 1999 compared with those of the preceding year (table 6).

Poland's mining and mineral-processing industry was extensive and appeared well positioned to respond to the country's rising needs for all forms of mineral raw materials, especially those consumed by the construction sector of the economy (table 9).

Efforts to restructure and privatize Poland's steel industry and steel trade issues continued to be among the leading mineral industry concerns during the year.

With respect to trade issues, the Ministry of the Economy announced plans to conduct an investigation into possible steel dumping practices in Poland by a number of member states of the Commonwealth of Independent States (CIS). The main steel commodities at issue were hot-rolled coils and heavy plates. Exports to Poland by these countries allegedly were sufficiently large and priced sufficiently low (reportedly up to 30% lower than comparable domestic prices) to warrant an investigation (Metal Bulletin, 1999a).

The Government of Poland remained committed to privatizing fully the country's iron and steel industry. According to officials of Poland's Ministry of the Treasury, which oversees the denationalization of industry, the privatization of the steel industry should create important foreign investment opportunities that would make the industry more competitive (Metal Bulletin, 2000f).

Poland's largest flat rolled steel producer, Huta Sendzimira SA, was among the industry leaders poised for privatization. An improving Polish economy raised domestic demand for rolled steel, which allowed Huta Sendzimira to boost revenue significantly in 2000 (60% in the first quarter of 2000 compared with that of 1999) with the rate of finished steel output approaching the company's more than 2-million-metric-ton-per-year (Mt/yr) capacity (Metal Bulletin, 2000g). Huta Sendzimira's exports continued to grow with sales abroad and amounted to 8% of production in 1998, 10% in 1999, and more than 12% was expected for 2000. To increase efficiency, the company reported reaching an agreement with labor unions, which would allow a reduction of direct employment at the steel complex from 17,400 to 8,600 workers by yearend. Huta Sendzimira management planned to raise finished steel capacity to 2.8 Mt/yr from 2.2 Mt/yr and to implement a $350 million modernization program to improve product quality and the size of coil to 30 metric tons (t) from 11 t (Metal Bulletin, 2000e).

In October, the Treasury Ministry of Poland gave Huta Katowice S.A. (HK) sanction to proceed with privatization. This authorization was given during a shareholder's meeting that included representatives of the Ministry. This was expected to clear the way for two joint ventures to go forward. The first joint venture, HK Long Ltd., would be owned by Corus Group plc of the United Kingdom (31%), HK (30%), the European Bank for Reconstruction and Development (EBRD) (20%), and Polish investment banks (19%). HK Long would produce long products (rails, beams, etc.). The second joint venture HK Zowb would focus on the production of flat products. Initially, Danieli S.p.A. of Italy would acquire 20% of the shares with the balance to be controlled by HK. During the second phase or stage of privatization, Danieli would acquire an additional 20% of equity in HK Zowb. By yearend 2000, Danieli planned to construct a slab caster at HK Zowb, which would have an initial capacity to produce 1.3 Mt/yr and which would increase to 1.8 Mt/yr following the completion of the slab caster and hot-rolling mill aggregate. The construction of the hot strip mill would start during the second phase of privatization in the middle of 2001 (Metal Bulletin, 2000d).

In midyear, Huta "Lucchini-Warszawa" Sp. z.o.o. (LW), which produced special steels, announced the beginning of the enterprise's second phase of modernization. LW [owned by Italy's Lucchini Group (66% of equity)] initially would begin installing a vacuum degassing unit and modernizing the rolling mill. The modernization of the forge and the development of ingot casting for bearing steel production also was planned. Phase II of LW's modernization program was to be funded entirely by the enterprise's stockholders. About 70% of LW's output was sold on the domestic market; the major share of the balance was exported to European Union (EU) countries, mainly Germany and Italy (Metal Bulletin, 2000a).

In 2000, foreign commercial issues and activities in the iron and steel sector included concerns expressed by Polish steel producers about influxes of cheaper steels from the Czech Republic and the countries of the former Soviet Union. Talks between the Governments of the Czech Republic and Poland were held during the early part of the year under the auspices of the CEFTA to help resolve the trade issue (Metal Bulletin, 2000h, i). To facilitate exports of iron ore to Poland, LebGOK, which was the trading arm of Russia's mining and beneficiation complex Lebedinsky GOK, opened a sales office in Warsaw. Russia was an important supplier of iron ore to Poland (Metal Bulletin, 2000b).

A major trend in Poland's nonferrous metals sector was the denationalization program that encompassed the aluminum, copper, and zinc industries. In 1999, the Government of Poland planned to sell a 10% stake in the country's largest producer of copper, KGHM S.A. The Government's share of KGHM amounted to 52.13% of the stock; 15% was owned by KGHM's employees; and the balance was listed on the London and the Warsaw Stock Exchanges. Impexmetal SA (nonferrous and ferrous metals) controlled several subsidiaries that produced aluminum [44,000 metric tons per year (t/yr)], zinc (13,000 t/yr), and blister copper (2,400 t/yr). Poland's Ministry of State Treasury, which controlled about 26.5% of Impexmetal's shares, indicated plans to sell off a majority of its shares in Impexmetal (Metal Bulletin, 2000c).

All copper ore in Poland was mined by the KGHM copper mining, beneficiation, smelting, and refining complex in the Lubin area, which accounted for more than 3% of world copper production. The room and pillar mining method was used at the Lubin, the Rudna, and the Polkowice-Sieroszowice mines at depths that ranged from 600 to 1,200 meters (m) (about 1,900 to 3,700 feet). Chalcocite is the principal mineral, but smaller amounts of bornite and chalcopyrite also occur. The mineralization is mainly in the shale horizon but extends into the overlaying carbonate and underlaying sandstone layers. Ore reserves under exploitation, as of December 31, 2000, amounted to about 780 million metric tons (Mt) that contained 16.5 Mt of copper with ore grades that ranged from 1.37% (Lubin mine) to 2.58% (Polkowice-Sieroszowice mine). Two varieties of concentrate are produced—Rudna, which contains 28% copper, and Polkowice, which averages 25% copper. Total reserves amounted to about 2.3 billion metric tons that contains about 44 Mt of metal (Mining Journal, 1999).

The Rudna mine has the largest production capacity, which amounted to about 13 Mt/yr. The concentrator at Rudna processes Rudna ores as well as some ores from the Polkowice-Sieroszowice Mine; its capacity was rated to produce about 700,000 t/yr of concentrate. Output by the Polkowice-Sieroszowice mine and concentrator amounted to about 13 Mt/yr of ore and 450,000 t/yr of concentrate. The Lubin mine accounted for about 9 Mt/yr of ore to produce about 465,000 t/yr of concentrate (Ministry of Environmental Protection, Natural Resources and Forestry, 2001). Major production increases of refined copper were achieved in 1999 and 2000, with output levels reaching 470,494 t and 486,002 t, respectively, compared with 446,837 t in 1998. In 2000, KGHM's wages increased by 12%, following negotiated agreements with the unions (Metal Bulletin, 2000k)

In late 1999, KGHM began to evaluate additional sources of copper ore in Zambia that could provide feedstock to the Mufulira smelting and refining complex as part of the company's effort to acquire additional copper mining and processing assets. The ore deposit that has been supplying the Mufulira complex was approaching depletion. Having completed due diligence work on Mufulira's assets in August, KGHM would pay $17 million within a 5-year period for the 60,000-t/yr smelting and refining complex should it decide to proceed with the deal (Metal Bulletin, 1999b). In other foreign developments, KGHM's copper mining operations in Congo (Kinshasa) at the Kimpe mine were to be terminated owing to losses incurred at the facility. KGHM's mining activity at Kimpe began in 1997; according to company spokespersons, losses through early 2000 amounted to about $40 million (Metal Bulletin, 2000k).

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SLOVAKIA

Slovakia continued to be a modest regional producer of a variety of minerals. Aluminum and steel production formed the dominant elements in the country's metals sector. The major industries in the metals sector involved the production of aluminum and steel. Steel production was based mostly on imported raw materials, and that of aluminum was based entirely on imported bauxite and alumina. Small quantities of copper, gold, lead, and zinc also were produced. Among industrial minerals, the country registered production of barite, clays, magnesite, and salt. Brown coal and lignite and minor quantities of gas and petroleum comprised Slovakia's production of mineral fuels (table 10).

The economy of Slovakia remained in transition to a full market economy system. The need to denationalize expeditiously the state's commercial assets and to reduce subsidies to the public sector often was tempered by policies promulgated to maintain social stability, which had contributed to the country's uneven economic performance. In 2000, Slovakia's GDP increased by 2.2% (constant prices) compared with that of 1999. Compared with negative growth of industrial production in 1999, industrial production in 2000 showed marked improvement with a growth rate of 9.3%, compared with that of 1999 (U.S. Central Intelligence Agency, 2001).

Slovalco was Slovakia's sole producer of primary aluminum. The enterprise, which was originally known as ZSNP, a.s., was put into full operation in 1953. Following the restructuring of the enterprise's assets in 1993, Slovalco became a subsidiary of ZSNP and was entirely involved in primary aluminum production. During the post-1993 period, Slovalco began a program of modernization and facility expansion that garnered investment capital from the EBRD and Hydro Aluminium AS of Norway. Hydro and EBRD acquired 14.5% and 10% of Slovalco's shares, respectively; the balance remained with ZSNP (Slovalco, 2000, p. 5-8). Completion of the modernization of the aluminum production process allowed the plant's environmental protection standards to be more compatible with those of the EU (European Bank for Reconstruction and Development, 1998, p. 1-5).

According to the latest available data, most of Slovalco's production goes for exports. Sales of finished aluminum during 2000 amounted to 141,562 t (5% increase compared with those of 1999), of which 85.6% was exported. Exports to the EU accounted for 61.7% of total exports of aluminum in 2000. The marketed product mix was billets, 69.8%; primary foundry alloys, 25.85%; wire rod, 3.66%; and liquid metal 0.69% (Slovalco, 2000, p. 9). In 2000, Slovalco invested approximately $3.9 million mainly for renovation and streamlining production processes and for health and safety improvements. Construction on facility expansion to raise production to 144,000 t/yr from 35,000 t/yr was to have begun in 2000.

Gold was mined from the Svetozár gold ore deposit at Banská Hodruša by Slovenská banská spol. s.r.o., which was the country's sole gold producer. Mined gold amounted to 306 kilograms, or about 16% less than that produced in 1999. Termination of mining at Banská Hodruša was expected in the near-term mainly because of depletion of resources (Balaz, 2001). Closure of the silver mining operations at Roznava also was reported with the subsequent flooding of the Striebvorna Mine.

In gold exploration and mine development activity, Argosy Minerals Inc. of Canada continued to outline new ore bodies in the Kremnica region. In 2000, work focused on as-yet unmined areas about 10 kilometers south of Kremnica; data show clay and silica alterations within volcanic rocks that overlie the Kremnica ore horizon. To explore and develop this area further, Argosy reported seeking a joint-venture partner (Argosy Minerals Inc., 2001). Previous exploration work in the Kremnica region yielded estimates of more than 958,000 ounces (29.8 t) of inferred reserves of gold and more than 7 million ounces (218 t) of silver at a 1.0-g/t cut-off grade for gold (Argosy Minerals Inc., 1999).

The completion of negotiations to purchase VSZ a.s. by U.S. steel producer USX, which has received the approval of the Government of the Slovak Republic, was expected in October. The Government followed up its approval by raising its stake in VSZ to 53%; this would give it free reign to sell the steel plant to USX. USX would acquire 100% of the steelmaking part of the operation; the nonsteel assets could remain under the VSZ management (Metal Bulletin, 2000a, b). The acquisition of VSZ by USX would increase the production capacity of VSZ by 3.4 Mt/yr. USX's modernization plan for VSZ included a first phase with an investment that was to amount to $700 million. The initial phase was to include the modernization of the tin mill with the installation of a 200,000-t/yr tinning line and a continuous annealing plant and temper mill. Additionally, a vacuum degassing unit was to be installed, a 600,000-t/yr push-pull pickling line, and a 300,000-t/yr hot-dipped galvanizing line. The acquisition of VSZ would allow the direct participation by USX in the European market for the first time in about 10 years (Paxon, 2000).

VSZ's nonsteelmaking assets in the industrial minerals sector that were sold to foreign investors during the year included the limestone and dolomite quarrying subsidiaries, VSZ Keramina (100% of stock) and VSZ Dolomit (78% of stock), respectively, which were acquired by Carmeuse SA of Belgium for $29 million (Building Bulletin, 2000). Other developments in the industrial minerals sector included reprieve for the Komag magnesite mining operations in Kosice, which has been reported to be at the point of closure in 1999. Komag's operations at Kosice were acquired by Slovakia's leading producer of magnesite SMZ a.s. Jeslava. Komag's refractory kilns were brought back on-line to continue processing magnesite for SMZ. The Kosice Mines were not reopened during the year and remained on a care-and-maintenance basis. Slovakia's mine output of magnesite increased by about 9% in 1999 compared with that of 1998. Also, development of the talc deposit at Gemerska Poloma was undertaken by Rozmin Ltd. (Balaz, 2001).

In the mineral fuels sector, production declines of 7%, 5%, and 3% were noted for natural gas, petroleum and condensate, and coal, respectively, which were attributed partly to the output shortfalls at the Velky Kris coal mine and the closure of the Ptruska oil and gas well (Balaz, 2001).

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TABLE 1
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Metals:						
Aluminum, secondary e/		45,000	45,000	45,000	40,000	40,000
Copper, refined, secondary e/		20,000	20,000	20,000	23,037 r/ 4/	20,000
Gold, metal	kilograms	--	--	--	3,207	3,000 e/
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	32	28	26	23	21
Fe content e/		9,000	8,000	7,000	6,000	6,000
Metal:						
Pig iron	thousand tons	4,898	5,195	4,982	4,022	4,621
Ferroalloys, totals electric furnace e/	do.	1	1	1	1	1
Steel, crude	do.	6,257	6,495	6,498	5,616 r/	6,216
Semimanufactures	do.	9,368	10,017	10,205	10,207 r/	11,637
Lead, metal, secondary e/		20,000	20,000	20,000	29,280 r/ 4/	30,000
Silver		--	--	--	24	25 e/
Uranium, mine output, U content		589	624	611	605	498
Zinc, metal, secondary e/		1,000	1,000	1,000	145 r/ 4/	150
Industrial minerals:						
Cement, hydralic	thousand tons	5,015	4,877	4,604	4,241 r/	4,093
Clays:						
Bentonite	do.	59	110	125	160	280
Kaolin	do.	2,798	2,982	3,049	5,183	5,573
Other	do.	738	759	1,030	1,070 r/	1,120
Diamond, synthetic e/	carats	5,000	5,000	5,000	5,000	5,000
Diatomire		35,000	42,000 r/	35,000 r/	37,000 r/	34,000
Fertilizer, manufactured:						
Nitrogenous, N content		252,600	250,000 e/	247,000	220,000 r/	257,000
Phosphatic, P_2O_5 content		415,500	400,000 e/	80,000	100,000 e/	100,000 e/
Potassic, K_2O content e/		25,000 4/	20,000	20,000	20,000	20,000
Mixed		552,300	500,000 e/	100,000	77,000 r/	75,000
Feldspar		211,000	243,000	266,000	244,000	337,000
Gemstones, crude, pyrope-bearing rock		39,000	49,000	43,000	54,000	62,000
Graphite		30,000 r/	25,000	28,000	22,000	23,000
Gypsum and anhydrite, crude		443,000	241,000	222,000	136,000	82,000
Lime, hydrated and quicklime	thousand tons	1,176	1,217	1,151	1,142 r/	1,202
Nitrogen, N content of ammonia		304,100	251,000	258,100	222,500	250,000
Quartz		4,000	13,000	1,000	3,000	--
Salt e/		180,000	--	--	--	-- 4/
Sand and gravel:						
Common sand and gravel	thousand cubic meters	12,350	11,727	9,279	12,781 r/	12,640
Foundry sand	thousand tons	1,079	769	815	717	829
Glass sand	do.	1,130	994	827	980	985
Stone:						
Basalt (for casting)		90,000	103,000	96,000 r/	89,000 r/	14,000
Dimension stone	thousand cubic meters	190,000	258,000	305,000	300,000 r/	320,000
Limestone and calcareous stones	thousand tons	10,610	11,304	11,558	11,703	11,808
Building stone	thousand cubic meters	9,891	10,845	9,528	10,292 r/	10,111
Sulfur, byproducts, all sources e/		40,000	40,000	40,000	40,000	40,000
Sulfuric acid		350,000 e/	333,000	327,000	350,000 e/	350,000 e/
Wollastonite		800	--	--	--	--
Mineral fuels and related materials:						
Coal:						
Bituminus	thousand tons	21,784	20,847	19,521	17,227	17,028
Brown and lignite	do.	60,441	58,142	51,953	45,370	51,063
Coke	do.	4,836	2,916	4,009	3,340	3,411
Fuel briquets from brown coal	do.	600	600	325	288	253
Gas:						
Manufactured, all types e/	million cubic meters	800	800	800	800	800
Natural, marketed 5/	do.	146	118	137	143	118

See footnotes at end of table.

TABLE 1--Continued
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Mineral fuels and related materials--Continued:						
Petroleum:						
Crude:						
As reported	thousand tons	155	159	172	176	168
Converted	thousand 42-gallon barrels	1,052	1,080	1,167	1,197	1,142
Refinery products e/	do.	27,000	27,000	35,000	35,000	35,000

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes available data through November 2001.

3/ In addition to the commodities listed, arsenic, dolomite, illite, sodium compounds, talc, and zeolites are produced, but available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

5/ Includes gas produced from coal mines. Gross output of natural gas is not reported but is believed to exceed reported market output by an inconsequential amount.

TABLE 2
CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity 2/	Major operating companies	Location of main facilities	Annual capacity
Cement	Bohemia, Cizkovice, Hranice, Karlov Dvor, Lochkov, Pracovice, and Velary	Bohemia	3,500
Do.	Bystre, Malomerice, Mokra, Ostrava-Kunice, and Zahorie	Moravia	2,000
Clays:			
Bentonite	Keramost a.s.	Most	150
Kaolin	Mines in Karlovy vary area	West Bohemia	450
Do.	Mines in Plzen area	Central Bohemia	150
Do.	Zapadoceske Koalinove a Keramicke Zavody a.s.	Horni Briza	190
Coal:			
Bituminous	Mines in OKD coal basin	Ostrava-Karvina, north Moravia	22,100
Do.	Mines in KD coal basin	Kldano, central Bohemia	3,000
Brown	SHD administration	Most, northwest Bohemia	61,000
Do.	HDB administration	Sokolov, west Bohemia	17,000
Lignite	JLD administration	Hodonin, south Moravia	5,000
Copper, ore	Zlate Hory	North Moravia	300
Graphite	Grafit a.s. Rudne doly Stare Mesto-F s.r.o.	Netolice Stare Mesto	35
Lead, metal, secondary, refined	Kovohute Pribram	Pribram	26
Lead-zinc, ore	Horni Benesov and Zlate Hory	Netolice	400
Mica	GARMICA s.r.o.	do.	5
Natural gas million cubic meters	Gasfields around Hodonin	South Moravia	25,000
Petroleum:			
Crude	Oilfields around Hodonin	do.	140
Refinery	Kolin, Kralupy, Pardubice, and Zaluzi	Bohemia	NA
Steel, crude	Nova Hut s.p. (Ostrava)	Kunice-Ostrava	3,800
Do.	Zelezarny Vikovice	Vikovice-Ostrava	900
Do.	Trinecke Zelezany (Trinecke Iron and Steel Works)	Trinec	3,000
Do.	Poldi United Steel Works	Kladno-Prague	1,700
Do.	Zelezarny Bila Cerkev	Hradek-Rokycany	300
Do.	Zelezarny Veseli	Veseli and Moravou	300
Do.	Zelezarny Chomutov s.p.	Chomutov	350
Do.	Bohumin Iron and Steel Works	Bohumin	400
Titanium oxide	Precheza a.s.	Precheza	25
Uranium	DIAMO s.p.	Straz pod Ralsken	2

NA Not available.

1/ Table includes data and information available through November 2001.

2/ Names and locations of main facilities, mines, and oil refineries are identical.

TABLE 3
HUNGARY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Metals:						
Aluminum:						
Gross weight:						
Bauxite	thousand tons	1,056	743	909	935 r/	1,046
Alumina, calcined basis	do.	208	76	138	295	300
Metal:						
Primary		30,000	35,000	35,000	34,000 r/	35,000
Secondary		63,808	63,190	64,000	54,000 r/	55,000
Total		93,808	98,190	99,000	88,000 r/	90,000
Copper, metal, refined including secondary e/		11,000	12,000 4/	12,000	12,000	12,000
Gallium, mine output, metal content	kilograms	5,000	--	--	--	--
Iron and steel, metal:						
Pig iron	thousand tons	1,548	1,190	1,258	1,309	1,340
Ferroalloys e/ 5/		8,000	8,000	8,000	8,000	8,000
Steel:						
Crude:	thousand tons	1,969	1,829	1,940	1,813	1,871
Semimanufactures, rolled only	do.	2,133	2,229	2,346	1,954	1,900 e/
Manganese ore:						
Run of mine:						
Gross weight		65,000	57,000	34,000	41,000 r/	40,000
Mn content e/		15,700	14,000	8,900	11,000 r/	10,000
Concentrate:						
Gross weight		33,813	15,291	15,000 e/	15,000 e/	15,000 e/
Mn content e/		11,000	5,000	5,000	5,000	5,000
Uranium, U_3O_8 content		250	200	100	--	--
Industrial minerals:						
Cement, hydralic	thousand tons	2,747	2,811	2,999	2,978	3,350
Clays:						
Bentonite:						
Raw		15,376	14,848	20,122	9,301 r/	4,818
Processed e/		9,000	9,000	12,000	6,000 r/	2,000
Kaolin, raw and washed		9,854	10,000	10,000 e/	9,000	9,000 e/
Gypsum and anhydrite		190,000 e/	150,000 e/	135,000	222,000 r/	200,000
Lime, calcined	thousand tons	468	498	500 e/	500 e/	500 e/
Nitrogen, N content of ammonia e/	do.	250	250	250	250	250
Perlite		110,000	120,000	130,000	148,000	150,000 e/
Refractory materials, n.e.s.: e/						
Chamotte products	thousand tons	20	20	20	20	20
Chrome magnesite products	do.	5	5	5	5	5
Sand and gravel:						
Gravel		11,000 e/	10,000 e/	8,160	10,297 r/	10,000 e/
Sand:						
Common	thousand cubic meters	275	284	250 e/	250 e/	300 e/
Foundry		9,386	72,537	172,300 r/	175,000	173,000
Glass		324,655	327,569	241,434	490,400	500,000
Stone:						
Dimension, all types e/	thousand tons	5,000	5,000	5,000	5,000	5,000
Dolomite	do.	582	1,440	1,772	2,140 r/	2,000 e/
Limestone	do.	4,949	4,941	4,802	5,010 r/	5,000 e/
Sulfus, byproducts, all sources e/		28,000	30,000	30,000	30,000	30,000
Sulfuric acid		89,712	84,463	85,000 e/	80,000 e/	80,000 e/
Talc e/		1,200	500 4/	500	500	500
Mineral fuels and related materials:						
Coal:						
Bituminous	thousand tons	962	924	877	738	725
Brown	do.	6,538	6,552	6,008	6,008	5,207
Lignite	do.	7,575	8,089	7,610	7,696 r/	7,873
Total	do.	15,075	15,565	14,495	14,442 r/	13,805
Coke, metallurgical e/		650	650	650	650	650
Fuel briquets	thousand tons	323	214	250	250 e/	200
Gas, natural, marketed	million cubic meters	4,756	4,513	4,300	3,100	3,000
Peat, agricultural use e/	thousand tons	45 4/	50	50	50	50

See footnotes at end of table.

TABLE 3--Continued
HUNGARY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Mineral fuels and related materials--Continued:						
Petroleum:						
Crude:						
As reported	thousand tons	1,477	1,355	1,258	1,243	1,136
Converted e/	thousand 42-gallon barrels	9,800	9,100	8,400	8,400	7,500
Refinery products e/ 6/	do.	40,000	40,000	40,000	40,000	40,000

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes available data through November 2001.

3/ In addition to the commodities listed, diatomite and a variety of other crude construction materials, such as common clays, are produced, but available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

5/ Hungary is believed to produce some blast furnace ferromanganese.

6/ Excludes refinery fuel and losses.

TABLE 4
HUNGARY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location of main facilities	Annual capacity
Alumina	Hungarian Aluminum Industrial Corp. (HUNGALU)	Ajka Timfoldgyar plant, about 120 kilometers southwest of Budapest, near Lake Balaton	400
Do.	do.	Almasfuzito Timfoldgyar plant near the Czech Republic border, 63 kilometers northwest of Budapest	240
Do.	do.	Moson-Magyarovar plant, in northwestern Hungary about 12 kilometers from Austrian and Czech borders	30
Aluminum, primary	do.	Inota plant, near Varpalota, 75 kilometers southwest of Budapest	46
Bauxite	HUNGALU: Bakony Mining Enterprise	Bakony District extending roughly 100 kilometers northwest along Lake Balaton	1,500
Cement	Belpafatvalvi Cement es Meszipari Rt. [Principal investors: Heidelberger and Schwenk (Germany) and Hungarian Group)]	Belpatfalva, near Miskolc, 125 kilometers northeast of Budapest	1,100
Do.	Beremend Cement es Meszipari Rt. [Principal investors: Heidelberger and Schwenk (Germany) (100%)]	Beremend, 45 kilometers south of Pecs	1,090
Do.	Dunai Cement es Meszmu Kft. [Principal investors: Heidelberger and Schwenk (Germany) (100%)]	Vac, 50 kilometers north of Budapest	1,200
Do.	Hejocsabai Cement es Meszipari Rt. [Principal investors: Holderbank (Germany) and Hungarian Group]	Hejoscaba, 150 kilometers northeast of Budapest	1,450
Do.	Labatlani Cementipari Kft. [Principal investor: Holderbank (Germany) (100%)]	Labatlan, 20 kilometers north of Tatabanya	550
Clays	Agyag-Asvany Kft. [Principal investor: Noran Resources plc (Ireland)]	Felsopeteney, one underground and two open pit mines and a 5,000-metric-ton-per-year processing plant. Products include ball clay, kaolin, and refractory clay	35
Coal:			
Bituminous and lignite	Magyar Szenbanyaszati Troszt (MSZT) (Hungarian Coal Mining Trust)	Tatbanya and Oroszlany coal mining region, 45 kilometers west of Budapest	8,900
Do.	do.	Mecsek coal mining region, near Pecs and Komlo, north of the Yugoslav border	3,100
Do.	do.	Borsod coal mining region, 130 kilometers northeast of Budapest	5,200
Lignite	do.	Thorez opencast mine at Visonta, 80 kilometers northeast of Budapest	7,000
Manganese	Orszagos Rec-es Asvanybanyak (National Ore and Mineral Mines)	Urkut manganese ore mines, 120 kilometers southwest of Budapest	160

See footnotes at end of table.

TABLE 4--Continued
HUNGARY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location of main facilities	Annual capacity
Natural gas million cubic feet	Hungarian Oil and Gas Co. (MOL)	Szeged and Algyo gasfields, southern Hungary	152,000
Do.	do.	Hajduszoboszo gasfields, 180 kilometers east of Budapest	50
Do.	do.	Smaller gasfields: Szank, Kardoskut, Bekes, Berefurdo, and others	39
Perlite	Perlit 92 Kft. [Principal investors: Noran Resources plc (Ireland) and Hungarian Group]	Palhaza, northeastern Hungary; open pit mine and processing plant	150
Petroleum:			
Crude thousand barrels	Hungarian Oil and Gas Co. (MOL)	Szeged-Algyo field, near Romanian-Yugoslav border; 50% of total capacity	7,000
Refined	Subsidiaries of MOL:		
Do. do.	Danube Petroleum Refining Co.	Szazhalombatta	55,000
Do. do.	Tisza Petroleum Refining Co.	Leninavaros	22,000
Do. do.	Zala Petroleum Refining Co.	Zalaegerszeg	4,000
Silica	Uveg-Asvany Kft. [Principal investors: Noran Resources plc (Ireland) and Hungarian Group]	Mine and plant at Fehevaresugo	660
Steel	Dunaferr Dunai Vasmu Rt.	60 kilometers south of Budapest	1,400
Do.	OAM-Ozdi Acelmuvek Kft.	120 kilometers northeast of Budapest	360
Do.	DAM-Diosgyori Acelmuvek es Kereskedelmi Kft.	Diosgyoer, 145 kilometers northeast of Budapest	850

1/ Table includes data and information available through November 2001.

TABLE 5
POLAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Metals:						
Aluminum, metal, primary	metric tons	51,900	53,614	54,168	50,974	46,941
Cadmium:						
Meta, primary	do.	--	22	-- r/	-- r/	--
Oxide	do.	31	62	61	27 r/	30 e/
Copper:						
Ore:						
Gross weight	do.	27,427	21,165	27,594	28,395	28,503
Cu content	do.	472,600	464,600	490,900	523,120	525,000 e/
Concentrate:						
Gross weight	do.	1,650	1,600	1,750	1,900 e/	1,900 e/
Cu content	do.	421,900	414,800	436,200	464,000	465,000 e/
Metal:						
Smelter:						
Primary	do.	410,000 r/	415,500	422,243	490,384 r/	507,846
Secondary e/	do.	4,800	15,000	10,000	9,000 r/ 4/	10,000
Total	do.	414,800 r/	430,500 r/	432,243 r/	499,384 r/	517,846
Refined, electrolytically, primary and secondary	do.	424,700	440,600	446,837	470,494	486,002
Gold, metal, smelter	kilograms	598	435	409	489 r/	367
Iron and steel:						
Pig iron:						
For foundry use		219	263	288	197 r/	200 e/
For steel production		6,321	7,032	5,841	5,036 r/	6,292
Total		6,540	7,295	6,129	5,233 r/	6,492
Ferroalloys:						
Ferromanganese, from blast furnace	metric tons	59,900	47,500	50,152	100 r/	50,000
From electric furnace:						
Ferrochromium	do.	3,785	6,200	4,200	-- r/	--
Ferrosilicomanganese	do.	25,000	20,000	15,100	10,000 e/	15,000 e/
Ferrosilicon	do.	71,800	77,300	75,000	62,481 r/	65,000 e/
Other electric furnace alloys	do.	5,800	8,500	13,300	2,700 r/	5,000 e/
Total	do.	106,385	112,000	107,600	75,181 r/	85,000 e/

See footnotes at end of table.

TABLE 5--Continued
POLAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Metals--Continued:						
Iron and steel--Continued:						
Steel, crude:						
From open hearth furnaces		1,118	1,057	494	378	500 e/
From oxygen converters		6,757	7,531	6,223	5,452	6,496
From electric furnaces		2,554	2,994	3,197	3,022	3,500 e/
Other		3	2	1	1	2 e/
Total		10,432	11,584	9,915	8,853	10,498
Semimanufactures:						
Hot rolled		8,532	9,296	7,987	6,991	7,530
Cold rolled		1,788	1,982	1,764	2,194	2,000 e/
Pipe		532	538	500	484	500 e/
Lead:						
Pb-Zn ore, gross weight		5,034	4,938	5,052	5,068	4,500
Mine output:						
Pb content of Pb-Zn ore	metric tons	74,900	68,800	73,814	81,849	65,000 e/
Pb content of Cu ore	do.	38,600	42,600	42,600	35,000 r/	35,000 e/
Total	do.	113,500	111,400	116,414	116,849 r/	100,000 e/
Concentrate, gross weight	do.	88,700	84,600	90,400	104,000 e/	80,000 e/
Pb content	do.	59,800	55,600	59,533	68,358	55,000 e/
Metal:						
Smelter:						
Primary	do.	26,400	29,600	28,700	31,000 r/	25,000 e/
Secondary	do.	43,000	43,700	50,500	50,000 e/	30,000 e/
Total	do.	69,400	73,300	79,200	81,000 r/	55,000 e/
Refined	do.	66,000	64,800	64,300	63,895	45,412
Platinum-group metals, average content of slimes: e/ 5/						
Palladium	kilograms	18	12	12	12	12
Platinum	do.	30	20	20	21	21
Selenium	tons	73	76	67	67 r/	70 e/
Silver, mine output, Ag content, recoverable	do.	935	1,038	1,108	1,100	1,144
Zinc:						
Zn content:						
Mine output	metric tons	186,500	182,900	182,349	185,689	170,000 e/
Concentrate output	do.	159,000	158,300	157,874	160,082	155,000 e/
Metal, smelter, primary and secondary	do.	165,000	172,919	178,016	177,804	161,000
Industrial minerals:						
Barite:						
Crude	do.	21,700	3,400	--	--	--
Beneficiated	do.	6,200	600	--	--	--
Cement:						
Klinker for cement		11,756	12,739	11,974	11,678 r/	12,000 e/
Hydralic cement		13,959	15,003	14,970	15,555 r/	14,810
Portland cement		12,668	13,824	13,934	14,310 r/	14,000 e/
Clays:						
Bentonite	metric tons	1,800	--	24,000	96,000	--
Fuller's earth	do.	6,200	6,100	5,400	5,000 r/	5,000 e/
Fire clay		248	199	175	140	153
Kaolin:						
Crude		281	262	270	300	300 e/
Beneficiated		72	84	82	89	99
Diamond, synthetic	thousand carats	206	35	7	-- r/	--
Diatomite		1,700	1,200	1,531	1,200 r/	1,500 e/
Feldspar:						
Run oif mine	metric tons	64,000	74,000	26,500	9,000 r/	10,000 e/
Beneficiated	do.	58,300	75,700	72,900	70,000	70,000 e/
Gypsum and anhydrite, crude 6/		1,028	1,035	1,029	1,163	1,284
Lime, hydrated and quicklime		2,461	2,516	2,406	2,299	2,300 e/
Magnesite:						
Ore, crude		21,000	30,000	38,300	54,800 r/	50,000 e/
Concentrate		19,300	6,403	5,745	--	--
Calcined	metric tons	800	400	--	-- e/	-- e/
Nitrogen, N content of ammonia		1,713	1,740	1,299	1,151	1,200 e/

See footnotes at end of table.

TABLE 5--Continued
POLAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Industrial minerals--Continued:						
Salt:						
Rock		923	791	748	923	831
Other		3,240	3,188	2,536	2,488	3,476
Total		4,163	3,979	3,284	3,411	4,307
Sand, excluding glass sand:						
Foundry sand		1,067	1,035	979	905	900 e/
Filling sand		17,510	14,155	13,695	11,352	11,000 e/
Lime-sand brick production sand	thousand cubic meters	1,086	799	728	673 r/	700 e/
Silica:						
Quartz and quartz crystal	metric tons	55,200	77,600	26,883	9,326	10,000 e/
Quartz, refractory	do.	294,000	205,000	204,000	172,000	175,000 e/
Quartz schist	do.	6,500	6,518	3,100	--	--
Glass sand		1,111	1,124	1,375	1,418	1,400 e/
Glass:						
Construction, flat		322	426	523	500 e/	500 e/
Technical		52	52	65	64	60 e/
Commercia		67	70	74	79	70 e/
Packing		811	873	918	928	70 e/
Sodium compounds, n.e.s.:						
Carbonate (soda ash), 98%		893	933	983	910	1,018
Caustic soda (96% NaOH)		705	718	807	737	394
Stone:						
Dolomite, mine output		5,345	5,781	5,679	1,861	2,204
Limestone, for lime production		12,764	13,136	11,950	12,373 r/	12,000 e/
Limestone, for nonlime end use		26,748	28,201	28,364	25,109 r/	29,801
Crushed and dimension stone, mine output		18,180	20,618	23,113	23,877 r/	23,000 e/
Sulfur:						
Native, frasch		1,745	1,673	1,348	1,175	1,369
Byproduct:						
From metallurgy		200 e/	256	260	278 r/	280 e/
From petroleum		30 e/	44	57	74	75 e/
Total		230 e/	300	317	352 r/	355 e/
From gypsum e/		12	12	10	10 r/	10 e/
Total		1,987	1,985	1,675	1,537 r/	1,734
Mineral fuels and related materials:						
Coal:						
Bituminous		137,987	137,793	115,726	111,894 r/	103,331
Lignite		63,845	63,169	62,820	60,839	59,484
Total		201,832	200,962	178,546	172,733 r/	162,815
Coke, coke oven		10,340	10,536	9,944	8,575	9,000 e/
Fuel briquets, all grades		96	80	64	50	50 e/
Gas:						
Natural	million cubic meters	4,754	4,836	4,852	4,757	4,956
Manufactured:						
Town gas	do.	16	10	8 r/	7 r/	10 e/
Coke oven gas	do.	4,247	4,414	4,145	3,579 r/	3,500 e/
Generator gas e/	do.	400	400	400	400	400
Total	do.	4,663	4,824	4,553 r/	3,986 r/	3,910 e/
Natural gas liquids e/	thousand 42-gallon barrels	30	30	35	40	40
Peat, fuel and agricultural		198	206	243	310	380 e/
Petroleum:						
Crude, reported		317	289	357	425	653
Refinery products 7/		30,000 e/	14,885	16,191	16,784	18,000 e/

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes available data through November 2001.

3/ In addition to the commodities listed, antimony and germanium, associated with polymetallic deposits, and cobalt and nickel, associated with copper ores, are produced in quantities that so far have not warranted further recovery.

4/ Reported figure.

5/ Estimates based on reported platinum- and palladium-bearing final (residual) slimes and their average Pt and Pd content from electrolytic copper refining.

6/ Includes building gypsum as well as an estimate for gypsum used in the production of cement.

7/ Includes virtually all major products.

TABLE 6
POLAND: EXPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons, unless otherwise specified)

Commodity		1998	1999	2000
Metals:				
Aluminum and articles thereof		148	168	216
Copper and copper alloys		193	230	248
Steel and steel semimanufactures		2,065	1,876	2,363
Silver	metric tons	1,033	1,057	1,042
Zinc		81	102	NA
Industrial minerals:				
Glass		362	370	598
Cement		2,131	1,617	978
Sulfur		833	801	1,024
Mineral fuels:				
Coal		28,078	24,104	23,200
Coke and semicoke		3,252	2,875	3,690
Refined petroleum		1,844	1,970	2,154

NA Not available.

Source: Central Statistical Offiice of Poland, Statistical Yearbook, 1999, 2000, and 2001.

TABLE 7
POLAND: IMPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity		1998	1999	2000
Metals:				
Aluminum and articles thereof		241	279	303
Iron ore and concentrate		9,982	7,418	9,737
Steel and steel semimanufactures		1,839	2,155	2,348
Industrial minerals:				
Glass		362	370	429
Mineral fertilizers		1,223	1,562	1,288
Mineral fuels:				
Coal, including briquettes		4,199	2,374	NA
Natural gas	million cubic meters	7,539	7,314	NA
Petroleum		15,367	15,873	18,000

NA Not available.

Source: Central Statistical Offiice of Poland, Statistical Yearbook, 1999, 2000, and 2001.

TABLE 8
POLAND: RESOURCES OF MAJOR MINERALS IN 2000

(Million metric tons unless otherwise specified)

	Number of deposits		Geologically documented resources		
Commodity	Total	Exploited	Total	Exploited	+/- 1999
Metal ores:					
Copper	14	5	2,485	1,567	-57.0
Lead and zinc	20	3	184	43	-4.1
Industrial minerals:					
Raw materials for chemicals:					
Sulfur, native	17	5	504	161	-0.2
Rock salt	20	4	80,365	8,441	-24.4
Raw materials for construction:					
Clay, argillaceous material for constrction ceramics:	1,208	400	4,008	647	+15.3
Ceramic clays	27	6	142	12	-0.2
Refractory clays	18	5	57	7	-0.3

See footnotes at end of table.

TABLE 8--Continued
POLAND: RESOURCES OF MAJOR MINERALS IN 2000

(Million metric tons unless otherwise specified)

Commodity		Number of deposits		Geologically documented resources		
		Total	Exploited	Total	Exploited	+/- 1999
Industrial minerals--Continued:						
Raw materials for construction--Continued:						
Dolomites		11	4	357	168	+15.6
Sand and gravel:						
Glass sand		30	7	606	131	-1.6
Filling sand		33	10	4,712	1,217	-469.9
Moulding sand		78	12	355	121	-1.3
Quartz sand for brick and concrete		157	53	725	152	+7.5
Gravel aggregates		4,174	1,479	14,621	3,090	+156.7
Stone:						
Stone for construction and road use		511	209	8,119	3,969	+104.8
Limestone and marl for lime and cement use		177	33	17,450	5,778	-229.6
Mineral fuels:						
Coal:						
Bituminous		130	47	45,362	16661	-1484.8
Lignite		78	12	13,984	2,136	-6.6
Gas						
Natural	billion cubic meters	241	179	142	113	-6.7
Coal methane	do.	42	18	91	16	+1.8
Petroleum		91	79	14	13	-0.4

Source: Central Statistical Office of Poland, 2001, Statistical Yearbook of the Republic of Poland; Polish Academy of Sciences, 2000, Minerals Yearbook of Poland.

TABLE 9
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity 2/	Major operating companies	Location of main facilities	Annual capacity
luminum:			
Primary	Huta Aluminum "Konin" S.A.	Konin	52.
Secondary	Zaklady Metalurgiczne "Skawina"	Skawina	20.
	Zaklady Metali Lekkich SA "Kety"	Kety	
	Zaklady Metalurgiczne "Trzebinia"	Trzebinia	
Barite 3/	Kopalnia Barytu "Buguszow" Sp. z.o.o.	Boguszow, Stanislawow	40.
Cement:	Zaklady Cementowo-Wapiennicze "Gorazdze" S.A.	Chorula	1,800 clinker; 2,400 cement.
Do.	Cementownia "Ozarow" S.A.	Ozarow	2,200 clinker; 2,400 cement.
Do.	Cementownia "Chelm" S.A.	Chelm	1140 clinker; 2,640 cement.
Do.	Kombinat Cementowo-Wapienniczy "Warta" S.A.	Dzialoszyn	600 clinker; 1,150 cement.
Do.	Cementownia "Malogoszcz" S.A.	Malogoszcz	1,840 clinker; 1,800 cement.
Do.	Zaklady Cementowo-Wapiennicze "Nowiny" S.A.	Sitkowka	785 clinker; 1,070 cement.
Do.	Cementownia "Strzelce Opolskie" S.A.	Strzelce Opolskie	1,257 clinker; 1,630 cement.
Do.	Kombinat Cementowo-Wapienniczy "Kujawy" S.A.	Bielawy	900 clinker; 1,000 cement.
Do.	Cementownia "Rudniki" S.A.	Rudniki	840 clinker; 1,470 cement.
Do.	Cementownia "Wierzbica" S.A.	Wierzbica	759 clinker; 1,000 cement.
Do.	Cementownia "Nowa Huta" S.A.	Krakow	290 clinker; 1,100 cement.
Do.	Cementownia "Rejowiec" S.A.	Rejowiec	600 clinker; 845 cement.

See footnotes at end of table.

TABLE 9--Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity 2/	Major operating companies	Location of main facilities	Annual capacity
Cement--Continued:	Cementownia "Odra" S.A.	Opole	433 clinker; 800 cement.
Do.	Cementownia "Groszowice" Sp. z.o.o.	do.	304 clinker; 425 cement.
Do.	Cementownia "Wiek"	Ogrodzieniec	710 clinker; 240 cement.
Do.	Fabrika Cementu "Wysoka"	Lazy	304 clinker; 425 cement.
Do.	Cementownia "Wejhorowie"	Wejhorowo	42 clinker; 45 cement.
Do.	Cementownia "Warszawa"	Warszawa (Warsaw)	600 cement.
Do.	Cementownia "Polcement-Saturn"	Wojkowice	400 cement.
Clay, kaolin	KSM "Surmin-Kaolin" S.A.	Lower Silesia, Nowogrodziec	50.
Coal:			
Anthracite	Zaklad Wydobywczo Przetworczy Antracytu Walbrzych-Gaj	Lower Silesia	200.
Bitumiuous	Bytomska Spolka Weglowa S.A.	Upper Silesia (nine mines)	140,000.
	Rudzka Spolka Weglowa S.A.	do. (six mines)	
	Gliwicka Spolka Weglowa S.A.	do. (seven mines)	
	Katowicki Holding Weglowy S.A.	do. (eleven mines)	
	Nadwislanska Spolka Weglowa S.A.	do. (eight mines)	
	Rybnicka Spolka Weglowa S.A.	do. (five mines)	
	Jastrzebska Spolka Weglowa S.A.	do. (six mines)	
	Seven independent mines	do.	
	Walbrzyskie Kopalnie Wegla Kamiennego	Lower Silesia	
	KWK "Nowa Ruda"	do.	
	KWK "Bogdanka" S.A.	do.	
Lignite	KWK "Belchatow"	Belchatow	75,000.
	KWK "Turow"	Turow	
	KWK "Konin"	Konin	
	KWK "Adamow"	Adamow	
	KWK "Sieniawa"	Sienawa	
Coke	Zaklady Koksownicze im. Powstancow St.	Upper Silesia	12,000.
	Zaklady Koksownicze "Przyjazn"	do.	
	Kombinat Koksochemiczny "Zabrze"	do.	
	Huta im. sendzimira	do. (Krakow)	
	Huta "Czestochowa"	do. (Czestochowa)	
	Zaklady Koksownicze "Walbrzych"	Lower Silesia	
Copper:			
Gross weight:			
Ore (1.2% to 2.2% Cu)	Kombinat Gorniczo Hutniczy Miedzi (KGHM) Polska Miedz S.A.	Lubin-Glogow District: Lubin Mine	8,760.
Do.	do.	Polkowice-Sieroszowice Mine	12,775.
Do.	do.	Rudna Mine	15,440.
Concentrate (25.2% to 25.9% Cu)	do.	Lubin beneficiation plant	465.
Do.	do.	Polkowice beneficiation plant	450.
Do.	do.	Rudna beneficiation plant	700.
Metal, refined	do.	Refineries at Glogow I, Glogow II, and Legnica	480.
Feldspar	Strzeblowskie Kopalnie Surowcow Mineralnych	Mine at Sobotka, Lower Silesia; workings at Pagorki Zachodnie and Parorki Wschodnie	50.
Ferroalloys:			
Electric furnace (FeSiMn, FeMn, FeCr, FeSi)	Huta "Laziska" S.A.	Upper Silesia and Laziska Gome	170.
Blast furnace (FeMn)	Huta "Pokoj" S.A.	Upper Silesia, Rudna Slaska	90.
Gold kilograms	KGHM "Polska Miedz" S.A.	Refinery at Glogow "Trzebinia"	550.
Gypsum and anhydrite	Zaklady Przemyslu Gipsowego "Dolina Nidy"	Southeastern Poland, Gacki	1,400.
	Zaklad Gipsowy "Stawiany"	Southeastern Poland, Szarbkow	
	Kopalnia Anhydrytu "Nowy Lad"	Lower Silesia, Niwnice	
	KGHM "Polska Miedz" S.A.	Lower Silesia, Iwiny	
Helium thousand cubic meters	Zaklad Odazotowania Gazu	Western Poland, Odolanow	3,000.

See footnotes at end of table.

TABLE 9--Continued

POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity 2/	Major operating companies	Location of main facilities	Annual capacity
Lead:			
Concentrate	Zaklady Gorniczo Hutnicze "Boleslaw"	Mines and concentrators at Olkusz and Pomorzany, Bukowno region	60.
	Zaklady Gorniczo "Trzebionka" S.A.	Mines and concentrators at Trzebinia	
Metal, refined	Huta Cynku "Miasteczko Slaskie"	Refinery at Miasteczko Slaskie	60.
	Huta Metali Niezelaznych "Szopienice"	Katowice	
Lime	Zaklady Przemyslu Wapienniczego Trzuskawica	Kieleckie County, Swietokrzyskie Mountains	4,500.
	Slaskie Zaklady Przemyslu Wapienniczego Opolwap S.A.	Opole County	
	Zaklady Przemyslu Wapienniczego Bukowa	Kieleckie County, Swietokrzyskie Mountains	
	Kombinat Cementowo-Wapienniczy Kujawy S.A.	Bydgoskie County	
	Zaklady Cementowo-Wapiennicze Gorazdze S.A.	Opole County	
	Zaklady Cementowo-Wapiennicze "Nowiny" S.A.	Kieleckie County	
	Produkeyjno-Handlowo-Uslugowe Wapmo-Sabinow	Czestochowa County	
	Wojcieszowskie Zaklady Przemyslu Wapienniczago Sp. z.o.o.	Jeleniogorskie County	
	Zaklady Przemyslu Wapienniczego w Sulejowie	Piotrkowskie County	
	Zaklady Przemyslu Wapienniczy w Plazie	Katowickie County	
Natural gas million cubic meters	Ministry of Mining and Energy	Gasfields at pre-Carpathian foothills, Carpathian Mountains Lowlands, near Ostrow Wielkopolski, Poznan, and Trzebnica, north of Wroclaw	4,900.
Nitrogen:			
Ammonia (NH_3)	Zaklady Azotowe "Pulawy" S.A.	Pulawy in eastern Poland	2,400.
	Zaklady Azotowe "Kedzierzyn" S.A.	Kedzierzyn in Upper Silesia	
	Zaklady Azotowe "Wloclawek" S.A.	Wloclawek in central Poland	
	Zaklady Azotowe S.A. w Tarnowie	Tarnow in southern Poland	
	Zaklady Azotowe S.A. w Chorzowie	Chorzow in Upper Silesia	
	Zaklady Chemiezne "Police"	Police in northwest Poland	
Fertilizer (N)	Zaklady Chemiezne "Police"	Police in northwest Poland	1,700.
Petroleum:			
Crude	Polskie Gornicstwo Naftowe i Gazownictwo Warszawa	Oilfields in north and northwest lowlands; sub-Carpathian region and Carpathian Mountains	200.
Do.	Predsiebiorstwo Poszukiwan i Eksploatacji Rpy i Gazu "Petrobaltic"	Baltic Sea shelf	100.
Refined	Petrochimia "Plock"	Plock in central Poland	13,500.
	Rafineria "Gdansk"	Gdansk in northern Poland	
	Rafineria "Chechowice"	Czechowice in southern Poland	
	Rafineria "Trzebinia"	Trzebinia in southern Poland	
	Rafineria "Glimar" Gorilice	Gorilice in southern Poland	
	Rafineria "Jedlicze"	Jedlicze in southern Poland	
	Podkarpackie Zaklady Rafyneryjne w Jasle	Jaslo in southern Poland	
Salt, all types	Inowroclawskie Kopalnie Soli S.A.	Gora, Mogilno I, and Mogilno II mines at Inowroclaw in central Poland	6,500.
	Kopalnia Soli "Klodawa"	Klodawa in central Poland	
	Kopalnia Soli "Wieliczka"	Wieliczka, in southern Poland, near Krokow; mining deposits at Barycz and Wieliczka	
	Kopalnia Soli "Bochinia"	Southern Poland, mines at the Lezkowice and Siedlec-Moszczenica-Lapczyca deposit	
	KGHM "Polska Miedz" S.A.	Sieroszowice in southwestern Poland	
	Kopalnia Wegla Kamiennego "Debiensko"	Debiensko in Upper Silesia	
	Janikowskie Zaklady Sodowe "Janikosoda" S.A.	Janikowo in central Poland	
Selenium	Huta Metali Niezelaznych "Szopienice"	Katowice	80.
	KGHM "Polska Miedz" S.A.	Refinery at Glogow	
Silver	do.	Refined from ore produced by the Szopienice Pb-Zn smelter-refinery largely from KGHM supplied slimes	1.
	Zaklady Metalurgiczne "Trzebinia"		

See footnotes at end of table.

TABLE 9--Continued

POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity 2/	Major operating companies	Location of main facilities	Annual capacity
Steel:			14,000 (crude).
Crude and semimanufactures	Huta "Katowice" S.A.	Plant at Dobrowa Gornicza, producing pig iron, cast steel, crude steel, and hot-rolled products	
	P.P. Huta im. T. Sendzimir	Steelworks at Krakow, producing pig iron, crude steel, hot- and cold-rolled products, pipes, and cast iron	
	P.P. Huta "Zawierciu"	Steelworks at Zawierciu, producing crude steel, hot-rolled products, cast iron, and cast steel	
	P.P. Huta "Czestochowa"	Steelworks at Czestochowa, producing pig iron, crude steel, hot-rolled sheets, pipes, and cast iron	
	Huta "Ostrowiec" S.A.	Steelworks at Ostrowiec-Swietokrzyski, producing crude steel and hot-rolled products	
	P.P. Huta "Labedy"	Steelworks at Gilwice, producing crude steel and hot-rolled products	
	Huta "Lucchini-Warszawa" Sp. z.o.o.	Steelworks at Warsaw, producing crude steel, hot-rolled products, and cold-rolled strip	
	P.P. Huta "Florian"	Steelworks at Swietochlowicach, producing crude steel, hot-rolled sheets, galvanized sheets, and cold-rolled strip	
	Huta "Stalowa Wola" S.A.	Steelworks at Stalowa Wola, producing crude steel	
	Huta "Jednosc" S.A.	Steelworks at Siemianowice Slaskie, producing crude steel, hot-rolled products, and pipes	
	Huta "Batory" S.A.	Steelworks at Chorzow, producing crude steel, hot-rolled products, and pipes	
	P.P. Huta "Baildon"	Steelworks at Katowice, producing crude steel, hot-rolled products, cold-rolled strip, and cast steel	
	Huta "Malapanew" S.A.	Steelworks at Ozimek, producing crude steel and cast steel	
	Huta "Zabrze" S.A.	Steelworks at Zabrze, producing crude steel, cast iron, and cast steel	
	Huta "Zygmunt" S.A.	Steelworks at Byton, producing crude steel, cast iron, and cast steel	
Semimanufactures only	P.P. Huta im. Cedlera	Steelworks at Sosnowice, producing hot-rolled products, cold-rolled strip, and cast iron	
	P.P. Huta "Kosciusko"	Steelworks at Chorzow, producing hot-rolled products	
	Huta "Pokoj" S.A.	Steelworks at Rudna Slasko, producing hot-rolled products	
	Huta "Andrezej" S.A.	Steelworks at Zawadskie, producing pipes	
	Huta "Ferrum" S.A.	Steelworks at Katowice, producing pipes	
	P.P. Huta "Bobrek" S.A.	Steelworks at Byton, producing pig iron, hot-rolled products, and cast iron	
	Huta "Buczek" S.A.	Steelworks at Sosnowice, producing cast iron and pipes	
	P.P. Huta "1 Maja"	Steelworks at Gilwice, producing hot-rolled products	
	Zaklad Wielkopiecowy "Szczecin" Sp. z.o.o.	Steelworks at Szczecin, producing pig iron	
Sulfur	P.P. Kopalne i Zaklady Przetworcze Siarki "Siarkopol"	Operations at Tarnobrzeg, mining the Jeziorko-Grebow-Wydza deposit	5,700.
	P.P. Kopalne i Zaklady Chemiczne Siarki "Siarkopol"	Operations at Grzybow, mining the Osiek and Grzybow-Gacki deposits	
Zinc, metal, refined	Huta Cynku "Miasteczko Slaskie"	Imperial Smelter at Miasteczko Slaskie	60.
Do.	Zaklady Metalurgiczny "Silesia" (input from Huta Metali Niezelaznych "Szopienice"	Refinery at Katowice	(30).
Do.	Zaklady Gorniczo Hutnicze "Boleslaw"	Refinery at Boleslaw	65.
Do.	Huta Metali Niezelaznych "Szopienice"	Katowice	28.

See footnotes at end of table.

TABLE 9--Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

1/ Table includes data and information available through November 2001.

2/ The data presented in this table were compiled, for the most part, from information provided in the Minerals Yearbook of Poland (Bilans Gospodarki Surowcami Mineralnymi w Polsce Na Tie Gospodarki Swiatowej 1995), prepared and published by the Department of Mineral and Energy Policy, Mineral and Energy Economy Research Centre of the Academy of Sciences of Poland, The Ministry of Environmental Protection, Natural Resources, and Forestry. Additionally, very valuable information and criticism was provided by Mr. Krystof Galos and other members of this academic department.

3/ The production of barite at the "Boguszow" barite mine was stopped in 1997 owing to large-scale area flooding, and its future status is uncertain.

TABLE 10
SLOVAKIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Metals:						
Aluminum:						
Alumina e/		100,000	100,000	100,000	100,000	100,000
Aluminum ingot, primary		111,446	110,205	108,006 r/	109,203	109,813
Copper:						
Mine output:						
Ore, Cu content		89	72	155	-- r/	--
Concentrate, gross weight		386	314	676	-- r/	--
Metal, refined, primary and secondary		25,000	25,000	25,000 e/	25,000 e/	--
Gallium, metal e/	kilograms	600	600	600	500	500
Gold, metal	do.	492	458	340	363	306
Iron and steel:						
Iron ore:						
Gross weight		960	970	899	891 r/	900
Fe content		240	250	300 r/	300 r/	300 e/
Concentrate, Fe content		436	453	479	458	447
Metal:						
Pig iron		2,928	3,072	2,756 r/	3,100 e/	3,100 e/
Ferroalloys, total electric furnace 4/		93	95	95 e/	95 e/	95 e/
Ferrochromium	metric tons	19,900	11,394	11,785 r/	6,986 r/	7,000 e/
Ferrosilicon	do.	70,000 r/	50,133 r/	49,963 r/	70,000 r/	50,000 e/
Steel, crude		3,458	3,484	3,178 r/	3,600	3,600 e/
Semimanufactures e/		3,500	3,600	3,500	3,500	3,500
Industrial minerals:						
Barite, concentrate	metric tons	44,930	62,102	14,880	15,900	13,700
Cement, hydraulic		2,841	3,136	2,875 r/	3,000	3,000 e/
Clays:						
Bentonite	metric tons	74,820	79,760	81,010	64,390	77,000
Kaolin	do.	23,240	22,720	14,580	22,930	21,000
Refractory	do.	3,000	3,000	12,000	3,000	3,000 e/
Diamond, synthetic e/	carats	5,000	5,000	5,000	5,000	5,000
Dolomite		2,069	1,989	1,796	1,505 r/	1,500 e/
Gypsum and anhydrite, crude	metric tons	121,000	116,000	128,000	117,000	120,000 e/
Lime, hydrated and quicklime		764	685	644 r/	700 e/	700 e/
Magnesite, concentrate	metric tons	824,800	863,600	877,840	918,000 r/	1,000,000
Nitrogen, N content of ammonia e/	do.	250,000	250,000	250,000	250,000	250,000
Perlite	do.	25,160	25,020	24,240	19,460	17,020
Salt	do.	106,800	126,800	100,470	119,000	121,700
Sand and gravel	thousand cubic meters	1,432	1,872	1,906	1,469 r/	1,500 e/
Stone:						
Limestone and other calcareous stones for cement		7,000 e/	7,800	7,200	7,000 r/	7,000 e/
Crushed stone	thousand cubic meters	3,739	3,510	4,318	2,844 r/	3,000 e/
Talc	metric tons	9,000	6,100	2,820	1,900	1,800
Zeolites	do.	10,000	14,000	10,000	14,000 r/	10,000 e/
Mineral fuels and related materials:						
Coal, brown and lignite		3,829	3,942	3,966	3,745	3,650
Coke:						
Metallurgical		1,854	1,708	1,730	1,515 r/	1,500 e/
Unspecified e/		200	200	200	200	200
Gas, manufactured, coke oven	million cubic meters	307	309	311	235 r/	250

See footnotes at end of table.

TABLE 10--Continued
SLOVAKIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Country and commodity 3/		1996	1997	1998	1999	2000
Mineral fuels and related materials--Continued:						
Petroleum						
Crude:						
As reported		68	63	61	59 r/	60
Converted	thousand 42-gallon barrels	480	426	400 e/	400 e/	400 e/
Refinery products e/	do.	40,500	40,000	40,000	40,000	40,000

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes available data through November 2001.

3/ In addition to the commodities listed, arsenic, diatomite, feldspar, illite, sodium compounds, sulfur, and sulfuric acid also were produced, but available information is inadequate to make reliable estimates of output levels.

4/ May include some FeCrSi and FeNi, if any were produced.

TABLE 11
SLOVAKIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2000 1/

(Thousand metric tons unless otherwise specified)

Country and commodity 2/ 3/		Major operating companies	Location of main facilities	Annual capacity
Aluminum		ZSNP Aluminum Works (Slovalco)	Ziar and Hronom, central Slovakia	60
Antimony:				
Ore		Liptovska Dubrava	Central Slovakia	50
Do.		Pezinok	Western Slovakia	50
Smelter		Vajskova	Central Slovakia	2
Cement		Lietavska Lucka, Stupava, and Turna	Slovakia	5,400
Coal:				
Brown		Hornonitranske Bane, a.s.	Prievidza, central Slovakia	3,500
Do.		Bana Dolina, a.s.	V'lky Krtis, southern Slovakia	500
Lignite		Bana Zhorie, a.s.	Holic, western Slovakia	400
Copper:				
Ore		Slovinky, Hodrusa-Hamre, and Rudnany	Central Slovakia	500
Refinery		Krompachy	do.	27
Gallium	kilograms	ZSNP Aluminum Works (Slovalco)	Ziar and Hronom, central Slovakia	4,000
Iron:				
Ore		Nizana Slana and Rudnany	Central Slovakia	160
Concentrate		do.	do.	1,300
Lead-zinc, ore		Banska Stiavnica	do.	200
Magnesite		SMZ a.s. Jelsava	Eastern Slovakia	350
Do.		Slovmag a.s. Lubenik	Central Slovakia	150
Petroleum, refinery		Bratislava, Dubova	Slovakia	NA
Salt		Solivary a.s., Presov	Eastern Slovakia	150
Steel, crude		VSZ Holding, a.s. [formerly Vychodoslvenske Zeleziane sp (East Slovak Iron and Steel Works)]	Kosice, eastern Slovakia	4,000
Do.		Zeleziarne Podbrezova a.s.	Podbrezova, Slovakia	600

NA Not available.

1/ Table includes data and information available through November 2001.

2/ Names and locations of main facilities, mines, and oil refineries are identical.

3/ All mining companies are Government-owned.

THE MINERAL INDUSTRIES OF

DENMARK, THE FAROE ISLANDS, AND GREENLAND

By Chin S. Kuo

DENMARK

Energy resource development dominated the mineral sector in Denmark, particularly the extraction of natural gas and petroleum from the North Sea. Output continued to exceed total national consumption, resulting in net gas exports. The country lacked economically exploitable metallic mineral resources but had large reserves of such industrial minerals as chalk, diatomaceous earth, limestone, and sand and gravel. The Danish economy was strong with a low inflation rate and a budget surplus in 2000.

The Government planned to impose a wide-ranging ban on the use of lead, effective March 2001. The ban would affect the use of lead and lead compounds in the construction and electronics industry, as well as its use as a stabilizer in plastics and the use of metallic lead in ballasts and weights. The use of cadmium, mercury, and nickel also would be restricted (Mining Journal, 2000a).

Danish Steel Works planned to cut production of heavy steel plate by 36% in response to low plate prices in the world market. The Frederisvkaerk plant would instead concentrate production on other product groups. The company produced less than 500,000 metric tons of heavy plate in 1999. It also produced round, square, flat, and reinforcing bars (Metal Bulletin, 2000).

The state oil and gas company DONG AS and Polish Oil and Gas Co. of Poland were planning to build a new $300 million pipeline to transport natural gas from the Baltic Sea to mid-European markets and had completed technical and economic assessments of the proposed BalticPipe system (Oil & Gas Journal, 2000a). Two other projects announced in 1997 and 1998 could complement the BalticPipe system.

DONG made a new oil discovery with its exploratory well Nini-1/1A, which was located northeast of the Siri Oilfield in the North Sea. The company planned to drill two more wells in the Nini area in order to further determine the magnitude of the oil reserve involved. The partners in License 4/95 included DENERCO Oil AS; three German companies, RWE-DEA AG, EWE AG, and Mobil Erdgas-Erdol Gmbh; and Enterprise Oil Denmark Ltd. (Danish Environment & Energy Newsletter, October 2000, North Sea oil—DONG has made an exciting oil discovery in the Danish part of the North Sea, accessed October 5, 2000, at URL http://www.mex.dk/uk/northsea.asp).

Statoil AS of Norway planned to spend $50 million on a new diesel dearomatization unit at its Kalundborg refinery near Copenhagen. The new plant using Synflex technology was expected to come on-stream by 2002 and would reduce the sulfur content of diesel fuel by 80% (Oil & Gas Journal, 2000b).

FAROE ISLANDS

The Faroes have semiautonomous status under the Kingdom of Denmark and have no significant mineral resources. Regulations covering offshore oil exploration in the Faroe Islands were scheduled to be in effect in the first quarter of 2001. They would cover health, safety and the environment, risk analysis and emergency preparedness, technological issues and the operation of offshore oilfields, and documentation requirements for oil companies. The islands could become a new offshore oil and gas province.

The Faroe Islands' first oil and gas licensing round was announced at yearend 1999 and launched in February 2000. It attracted bids from 17 international oil companies seeking permits to explore an area of 7,000 square kilometers (km^2) in 5 blocks to the east and southeast of the Islands. BP Amoco, Exxon-Mobil Corp., Statoil, and Texaco Inc. were among the major corporations interested in licensing in the areas of the Faroese continental shelf.

The Danish Ministry of Petroleum awarded 7 licenses to 12 oil companies, which were organized in 5 groups for offshore exploration. Four of the licenses were granted for a period of 6 years and three for 9 years. Statoil's involvement was through the Atlantic Margin Group, a partnership with Mobil North Sea and Enterprise Oil. Through its subsidiary Agip Denmark B.V., Ente Nazional Idrocarburi of Italy and the Faroese oil company Foroya Kolvetni P/F, was awarded two licenses covering an area of 700 km^2 in water depths of 1,000 meters offshore the Faroe Islands.

GREENLAND

A self-governing overseas administrative division of Denmark, Greenland was actively trying to encourage an increase in mineral exploration of its diverse geology. Mineral exploration was focused on base metals, diamond, gold, industrial minerals, iron, nickel, and platinum-group metals. In 2000, however, exploration activity decreased in terms of the numbers of exploration permits issued and the areas staked for exploration.

Crew Development Corp. of Canada commissioned Strathcona Mineral Services to supervise a grade verification program at Crew's 67% owned Nalunaq gold property. Mineralization was consistent within three zones of low, medium, and high grade. The resources were reported to be at least 9,000 kilograms (300,000 troy ounces) of contained gold within measured and indicated categories (Mining Journal, 2000c). The other 33% ownership of Nalunaq was held by

Nuna Minerals. Crew provided the majority of the $5 million exploration underground bulk sampling funding and increased its ownership to 67% from the original 50%.

Angus & Ross plc of the United Kingdom received a license from the Government to explore for tantalum in a 414-km^2 area in southern Greenland. The Geological Survey of Greenland had carried out investigations into niobium and tantalum occurrences in the mid-1980s and identified pyrochlore. Resources were estimated to be 50 million metric tons (Mt) with grades in the range of 0.03% to 0.10% tantalum oxide and 130 Mt with niobium grades of 0.4% to 1.0% (Mining Journal, 2000b).

In the oil and gas sector, seismic surveys west of Greenland increased in mid-2000 with three vessels operating. A licensing round was planned in the area in mid-2001. The first exploratory well, Qulleq-1, drilled on the Fylla prospect off western Greenland was a dry hole. The license group consisted of Phillips Petroleum Greenland AS and Statoil, 38.25% each; Nunaoil AS of Greenland, 15%; and DONG Gronland, 8.5%. Statoil's budget was $25 million for a dry hole and included site surveys (Oil & Gas Journal, 2001).

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Major Source of Information

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TABLE 1
DENMARK: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 e/	2000 e/
Aluminum metal, secondary e/		14,500	14,000	14,000	14,000	16,000
Cement, hydraulic		2,628,528	2,683,039	2,600,000 e/	2,600,000	2,650,000
Chalk		359,378	427,634	425,000 e/	400,000	400,000
Clays: e/						
Fire clay		1,800	20 3/	20	20	25
Kaolin		3,000	3,000	2,500	2,500	2,500
Other		8,050	8,000	6,000	6,000	6,500
Moler, extracted	thousand cubic meters	185	185	185	180	185
Gas:						
Manufactured e/	terajoules	1,210 3/	1,500	1,500	1,500	1,500
Natural:						
Gross e/	million cubic meters	7,500	9,530	9,600	9,600	9,700
Marketable	do.	5,710	6,960	7,000 e/	7,000	7,100
Iron and steel metal, steel:						
Crude	thousand metric tons	737	787	790 r/	748 r/ 3/	750 3/
Semimanufactures	do.	621	625 e/	706	600	700
Lime, hydrated and quicklime		108,628	115,129	116,000 e/	115,000 r/	115,000
Natural gas plant liquids e/	thousand 42-gallon barrels	45,000	45,000	45,000	45,000	46,000
Nitrogen, N content of ammonia e/		1,600	1,600	1,600	1,600	1,600
Peat e/		204,465 3/	205,000	205,000	200,000	200,000
Petroleum:						
Crude	thousand 42-gallon barrels	78,795	83,950	84,000 e/	84,000	85,000
Refinery products: e/						
Liquefied petroleum gas	do.	13,879 3/	1,600	1,600	1,600	1,700
Gasoline	do.	31,247 3/	30,200	30,000	30,000	30,000
Naphtha	do.	1,666 3/	1,200	1,200	1,200	1,300
Jet fuel	do.	1,800	1,800	1,800	1,800	2,000
Kerosene	do.	93 3/	100	100	100	100
Distillate fuel oil	do.	26,590 3/	28,000	28,000	28,000	28,200
Refinery gas	do.	2,880	1,600	1,600	1,600	1,700
Lubricants	do.	300	300	300	300	300
Residual fuel oil	do.	15,951 3/	13,500	13,500	13,000	13,000
Petroleum coke	do.	59 3/	60	60	60	60
Total	do.	94,500	78,400	78,200	77,700	78,400
Phosphates, crude, gross weight e/		1,200	1,200	1,200	1,200	1,300
Salt, all forms e/		600,000	600,000	600,000	600,000	605,000
Sand and gravel: e/						
Onshore	thousand cubic meters	18,000	18,000	18,000	18,000	18,000
Offshore	do.	5,000	5,000	5,000	5,000 r/	5,000
Total	do.	23,000	23,000	23,000	23,000	23,000
Of which, sand, industrial (sales)	do.	50	50	50	50	50
Stone: e/						
Dimension (mostly granite)		27,198 3/	26,000	26,000	26,000	27,000
Limestone:						
Agricultural		695,380 3/	700,000	700,000	700,000	700,000
Industrial		250,000	250,000	250,000	250,000	250,000
Sulfur, byproduct		7,465	10,585	10,000 e/	10,000	10,500

e/ Estimated. r/ Revised.

1/ Table includes data available through June 7, 2001. Estimated data based on sales of domestically produced mineral commodities.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reported figure.

THE MINERAL INDUSTRIES OF

ESTONIA, LATVIA, AND LITHUANIA

By Chin S. Kuo

ESTONIA

In 2000, Estonia's economy recovered from the effects of Russia's 1998 financial crisis, and the country's gross domestic product (GDP) posted a 6.5% growth. The country increased its industrial production, continued market reforms, and attracted foreign direct investment, especially from Finland. Estonia's primary source of energy is oil shale. The port of Tallinn is a transit center for petroleum product exports from Russia to Europe. The country depended on Russia for its supplies of oil and gas. In 2000, Estonia agreed with Latvia and Lithuania to coordinate energy markets and harmonize national energy programs. In addition to oil shale, the country mined peat and industrial minerals, such as clays, sand and gravel, and silica sand.

International Steel Industries L.P. of the United States planned to build a 400,000-metric-ton-per-year (t/yr) galvanizing line and warehousing facility in the port of Muuga in Tallinn. Groundbreaking was set for February 2001 with startup expected in late 2002 for the $205 million complex. The new plant, to be called Galvex, would initially produce construction-grade hot-rolled galvanized steel up to 168 centimeters wide and ranging from 0.2 millimeters (mm) to 1.8 mm in sheet thicknesses. HypoVereinsbank AG of Germany arranged for $94 million in financing for the facility and also would provide $40 million for working capital. Estonia's Hansabank would provide $5.5 million for credit facility. Total equity in the project was in excess of $60 million. Danieli Engineering of Italy would supply the equipment. The warehouse, Ruma Terminal, was a 35,000-square-meter import/export facility on the deepwater port (Metal Bulletin, 2000c).

Oil shale provided more than 75% of Estonia's total energy supply and was produced by majority state-owned Estonia Oil Shale Co. near Kohtla-Jarve in the northeastern part of the country. It was consumed for power generation by Estonia Energy Co. and Kohtla-Jarve Soojus Electric Co. and for shale-to-oil processing to produce 8,000 barrels per day (bbl/d) of distillate liquid fuels by Kiviter AS. Narva Power Plants and Estonia Oil Shale signed a contract for the supply of 8.7 million metric tons of oil shale in 2000 and 2001 at a price of $69 million. Negotiations between Suncor Energy of Canada and the Government to build a $147 million shale oil plant in northeastern Estonia were suspended in September because of environment-related problems.

Estonia continued privatization of its energy sector. In June, it agreed to sell to NRG Energy of the United States a 49% stake in Narva Power Plants, which had two oil-shale generation plants that supplied more than 90% of Estonia's electricity, and a 51% controlling stake in Estonia Oil Shale. NRG Energy committed up to $80 million in investment to modernize technology and to renovate infrastructure (U.S. Energy Information Administration, February 2001, Estonia—Country analysis brief, accessed February 15, 2001, at URL http://www.eia.doe.gov/cabs/estonia.html).

LATVIA

The Latvian economy showed healthy growth with a 4% increase in the GDP, low inflation of 2.2%, and declining unemployment of 7.9%. The country's exports continued to grow, but imports still outpaced exports. The fiscal budget deficit was 3.1% of GDP. The Government reduced the fuel excise tax rate during the summer. Because of that, the oil price increase on the world markets had little effect on consumer price indices in Latvia. The Government also approved a restructuring plan for the country's energy monopoly Latvenergo into independent electricity generating and transmission units (U.S. Embassy, Riga, Latvia, 2000).

ASW of the United Kingdom asked the United Kingdom's rebar accreditation body Cares to review its decision to give certification to reinforcing bar from Latvia. The company said that the rebar contravened British standards because it was produced via the open hearth route. Cares said that the open hearth route could produce very good steel if it was operated properly and that the rebar from Liepajas Metallurgs had passed all the specifications. About 40,000 metric tons of Latvian rebar had been imported into the United Kingdom in the 7 months between March 1 and September 30 (Metal Bulletin, 2000a). The open hearth steel mill at Liepaja used imported metallic raw materials from various sources and had an estimated capacity of 550,000 t/yr of crude steel and 900,000 t/yr of steel products.

Latvia had no domestic coal production but imported a small amount of coal, mostly from Poland. The country produced an average of about 500,000 t/yr of peat for fuel. Peat covers approximately 10% of Latvia's territory, with the heaviest concentration in the eastern plains near Riga.

Latvia has several large underground natural gas storage facilities and is a potentially important transit center for Russian oil and gas exported to Europe. The country also was dependent on Russian oil and gas for its domestic consumption. Latvian oil consumption remained steady at 37,000 bbl/d. The Government would sell exploration and development licenses for the nation's offshore oil reserves in an area of 2,675 square kilometers. The tender was expected to be announced in April 2001. Latvia had no oil refineries, and a plan to build a $200-million 40,000-bbl/d refinery in Latvia by the Russian Oil and Gas Industry Union had stalled. Russia's Gazprom was the main supplier of natural gas to Latvia. Latvenergo consumed 51% of the natural gas used in Latvia. The restructured and privatized Latvijas Gaze controlled the country's natural gas distribution system. The company's largest shareholders were Gazprom, Ruhrgas and Eon Energie AG of Germany, and Itera

Latvijas (U.S. Energy Information Administration, January 2001, Latvia—Country analysis brief, accessed January 31, 2001, at URL http://www.eia.doe.gov/cabs/latvia.html).

LITHUANIA

In 2000, with a total GDP of $11 billion, Lithuania's exports were valued at slightly more than $4 billion. Its chief exports were food products, textiles, and consumer electronics. The country's mining industry was limited to extracting peat and some industrial minerals. The majority of peat production was used in agriculture. Lithuania produced a small quantity of crude oil from the western part of the country and had an oil refinery at Mazeikiai, which was capable of producing 13 million metric tons per year of petroleum products. The country, together with Estonia and Latvia, would become a point of transshipment for Russian minerals and oil.

Danieli Engineering was to build a hot-rolling mill for stainless steel in the port city of Klaipeda for Penninox America Corp. of the United States. The mill would produce angles, flats, and channel sections, mainly for export to Europe and the United States. It would import the majority of its stainless raw material from Western Europe. The mill was due to be commissioned in late 2001, and the feedstock to be used would be plate in coil or cut lengths for heavy sections. The maximum product size would be 150-mm equal and unequal angles of 12 mm thickness (Metal Bulletin, 2000b).

If the Government takes steps to protect the domestic construction material market from imports from Belarus, Lithuania might lose its export market in Belarus. Antidumping investigations directed against cheap Belarussian products were launched in Lithuania following complaints by Akmenes Cementas and Naujasis Kalcitas, Lithuania's only producers of cement and quicklime, respectively. An antidumping duty of $9 per metric ton was imposed on quicklime imports in 2000. Silikatas, a silica brick producer, increased production costs owing to the antidumping duty.

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TABLE 1
ESTONIA, LATVIA, AND LITHUANIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
ESTONIA						
Cement		387,700	422,500	321,000	357,700 r/	329,100
Clays:						
For brick	thousand cubic meters	19,800	66,500	96,600	107,100	97,200
For cement	do.	27,200	25,500	33,000	38,400	37,700
Nitrogen, N content of ammonia		137,000	153,000	175,000	145,500 r/	127,500
Oil shale	thousand tons	14,735	14,383	12,463	10,685	11,726
Peat	do.	1,100	1,002	365	1,299 r/	586
Sand and gravel	thousand cubic meters	1,000 e/	1,109	1,411	1,063	1,247
Silica sand, industrial	do.	11,100	22,500	23,000	18,300	39,600
LATVIA						
Cement		325,008	246,377	365,629 r/	W	W
Gypsum		63,888	116,916	119,096 r/	W	W
Limestone		35,700	372,660	363,347 r/	W	W
Peat		552,100	554,700	171,700	956,353 r/	346,695
Sand and gravel		324,567	90,551	480,609 r/	787,317 r/	440,914
Steel:						
Crude		293,000	464,529	468,500	483,744 r/	500,292
Products		NA	NA	516,400	520,000	525,000 e/
LITHUANIA 3/						
Cement		700,000	714,000	788,300	666,000	569,500
Limestone		233,000	250,000 e/	250,000 e/	1,077,900 r/	783,300
Nitrogen, N content of ammonia		460,000 e/	467,300	407,300	401,300 r/	420,320
Peat		250,000 e/	295,200	202,000	390,100 r/	245,500
Petroleum:						
Crude		150,000	160,000	200,000	250,000 e/	250,000 e/
Refinery products		3,740,000	5,029,400	6,433,900	4,506,700	4,658,200

e/ Estimated. r/ Revised. NA Not available. W Withheld to avoid disclosing company proprietary data.

1/ Estimated data are rounded to no more than three significant digits.

2/ Table includes available data through September 2001.

3/ Lithuania produces other industrial minerals including clays and sand and gravel; consistent data is unavailable for deriving a multiyear production series.

THE MINERAL INDUSTRY OF

FINLAND

By Chin S. Kuo

The mineral resources of Finland include some 50 metals and 0 industrial minerals, as well as gems and soapstone. The overnment encouraged foreign investment in mineral xploration and exploitation. Foreign and domestic companies ere active in exploring for base metals, diamond, and gold. inland was a world leader in the technology of underground ining, mineral processing, and metallurgy. The country mported metal concentrates from various sources to feed its melters and was a net importer of these.

Finland's rapid economic growth with a 6% increase in gross omestic product in 2000 was fueled by an export boom, which rew by more than 9%. The country's forestry sector was at ull capacity and the electronics sector was continuing to apture new markets abroad. Domestic demand for products nd services, however, was surprisingly subdued. The inflation ate was one of the highest in the European Union.

The Government backed a proposal to sell its shareholdings f 39.9% in base metals and stainless steel producer Outokumpu yj and 40.1% in steelmaker Rautaruukki Oy. It also proposed o divest the 53.4% stake in the chemical company Kemira Oyj nd reduce to below one-third the 75.4% interest in the oil ompany Fortum Oil and Gas Oy. The Ministry of Trade and ndustry is in charge of privatization (Metal Bulletin, 2000a).

The local engineering firm Kumera Corp. intended to build a ew aluminum smelter in Finland with a capacity of 230,000 etric tons per year (t/yr) if the Government allowed the onstruction of a fifth nuclear reactor powerplant in the country nd the use of inexpensive energy. World demand for luminum would increase during the next 10 years (Market atch, March 11, 2000, Finland may acquire new 230,000 luminum smelter, accessed August 18, 2000, at URL ttp://www.alunet.net/shownews.asp?ID=476&type=1).

Outokumpu and Somincor of Portugal negotiated a 3-year opper concentrate contract. Outokumpu also was looking at onverting its Harjavalta nickel smelter to producing copper in he next few years, once nickel feed stocks had run out at Black wan, Cygnet, and other nickel mines (Metal Bulletin, 2000c).

Outokumpu Steel's merger with Avesta Sheffield of Sweden as approved by the European competition authorities. It also as approved by competition authorities in the United States nd Canada. The new company, AvestaPolarit, would combine he stainless steel operations of the two companies with a slab apacity of 1.7 million metric tons per year (Mt/yr). Outokumpu would own 55% of the new company, and Avesta Sheffield's shareholders, 45%. AvestaPolarit's main production facilities would be in Finland, Sweden, the United Kingdom, nd the United States (Engineering & Mining Journal, 2000c).

Outokumpu was to double stainless steel slab production at Tornio to 1 Mt/yr at a cost of $570 million. The investment included a new melting shop with an electric-arc furnace, converter, and continuous casting equipment, as well as a new plant for the rolling mills. The 3-year project was expected to reach full capacity in 2004 (Mining Journal, 2000b).

Rautaruukki started commercial production at its 400,000-t/yr galvanizing line at Hameenlinna. The $590 million plant came on-stream in April and increased the company's galvanizing capacity to 900,000 t/yr. Rautaruukki also spent $80 million in raising color-coating capacity at Hameenlinna from 100,000 to 150,000 t/yr (Metal Bulletin, 2000e).

OM Group, Inc. (OMG), of the United States purchased Outokumpu's 50,000-t/yr Harjavalta nickel refinery—including nickel matte leaching, solvent extraction, electrowinning, and hydrogen reduction facilities—for $185 million. OMG has production facilities at Kokkola processing part of the nickel and all of the cobalt produced at Harjavalta. The Harjavalta nickel refinery would continue to supply nickel to Outokumpu's Tornio stainless steel operation. Outokumpu would continue to smelt nickel concentrates from its own mines and toll smelt concentrates for OMG. The Hitura nickel mine was reopened in 1999 and remained open with production of 3,500 t/yr of concentrate. When Outokumpu's nickel reserves were depleted, it planned to withdraw from the nickel business and focus its metal production activity on copper and zinc (Engineering & Mining Journal, 2000b).

OMG began assembly work on a new solution purification line in the nickel extraction/reduction plant at Harjavalta refinery. The company planned to invest $600 million to $700 million on new equipment and machinery for the plant. Pure nickel solution was used in the production of nickel chemicals that would be used in batteries and cellular phones (Metal Bulletin, 2000b).

Gold Fields Ltd. and Outokumpu reported an initial 90,000-kilogram platinum-group-metal resource on joint-venture lands south of Rovaniemi in northern Finland. The resource was reported for the Ahmavaara and Konttijarvi areas in the Portimo Complex. Their Arctic Platinum Partnership was announced in March. Preliminary analysis suggested that substantially all the above resource might be extractable by open pit mining methods at an overall stripping ratio of 2 to 1 (Engineering & Mining Journal, 2000a).

Tertiary Minerals plc made two claim reservations in Finland for the rare metals tantalum and cesium and commissioned the Finnish Geological Survey to complete a confidential study into the potential for rare metals mineralization. The first claim reservation covered a pegmatite on Kemio Island in southwest Finland. The second was made over the Viitaniemi pegmatite in the Erajarvi district of southern Finland (Mining Journal, 2000a).

Belvedere Resources Ltd. of Canada completed a 1,240-meter, five-hole diamond drilling program on its Arkala property in central Finland which lies in the main sulfide belt, 10 kilometers (km) north of Outokumpu's Pyhasalmi Mine. Recent extensive bedrock sampling and old drill data defined a large alteration zone 3 km long. Two of the drill holes intersected disseminated sphalerite mineralization. Further followup drilling and bedrock sampling was planned (Canada

NewsWire, October 4, 2000, Belvedere Resources Ltd. announces update on recent drilling, accessed October 5, 2000, at URL http://www.newswire.ca/releases/October2000/04/c0208.html).

Outokumpu planned to acquire Norzink (owned by Rio Tinto plc and Boliden Mineral AB) in October and extended the term of its letter of intent till the end of January 2001. The extension was needed to enable the parties to finalize negotiations. Norzink operates a 150,000-t/yr zinc smelter and refinery near Odda, Norway. Outokumpu would pay $180 million for Norzink. The company was completing a $31 million 15% expansion project to 260,000 t/yr of zinc metal at its Kokkola zinc plant, which was due to come into production in 2001 (Engineering & Mining Journal, 2000c).

Industrial actions by workers in the chemicals industry affected production at Kokkola zinc refinery. The roasting process at the zinc plant was shut down on March 17. The intermediary stocks enabled the plant to continue producing zinc for a week. The plant produced some 600 metric tons per day of zinc, or about 225,000 t/yr (Metal Bulletin, 2000d). Outokumpu reported zinc production ran smoothly with 7% more zinc produced in the second quarter than during the same period in 1999.

The construction of a gas pipeline between Russia and Finland on the Baltic seabed might be finished by 2010. In 1998, Gazprom and Fortum set up a joint venture, NordTransGas Oy, to make a feasibility study and work out a business plan for the project. The overall cost of the project was estimated to be $10 billion (Petrodata-Petrodaily, August 3, 2000, [untitled], accessed August 14, 2000, at URL http://www.petrodata.co.uk/CGI/tbcgi.exe?CGILATEST).

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Major Source of Information

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TABLE 1

FINLAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/		1996	1997	1998	1999 e/	2000 e/
METALS						
Aluminum metal, secondary		35,308	38,200	40,500 r/	43,989 r/ 4/	43,200 4/
Cadmium metal, refined		648	650 r/	520 r/	700	700
Chromite:						
Gross weight:						
Lump ore e/	thousand tons	210	215	220	225	230
Concentrate e/	do.	360	365	380	400	400
Foundry sand e/	do.	12	9	10	10	10
Total	do.	582	589	610	635	640
Cr_2O_3 content	do.					
Lump ore e/	do.	70	75	75	75	80
Concentrate	do.	150	150 e/	150 e/	150	150
Foundry sand e/	do.	3	3	5	5	5
Total	do.	223	228	230	230	235
Cobalt, metal, powder, and salts		4,160	5,000	5,250	6,200 4/	7,700 4/
Copper:						
Concentrate, gross weight		24,000	22,000 e/	25,000 e/	28,000	29,000
Mine output, Cu content		9,261	8,500 e/	9,500 e/	10,500	11,600 4/
Metal:						
Smelter		178,675	159,000 e/	156,000 e/	149,600 4/	155,400 4/
Refined		110,715	116,000 e/	123,000 e/	114,700 4/	114,000 4/
Gold metal	kilograms	3,070	3,900	5,000 e/	5,900	5,000
Iron and steel, metal:						
Pig iron	thousand tons	2,457	2,786	2,912	2,954 4/	2,983 4/
Ferroalloys, ferrochromium	do.	228	237	231	256 r/ 4/	261 4/
Steel, crude	do.	3,301	3,687	3,932	3,956 4/	4,096 4/
Semimanufactures, rolled	do.	3,292	3,314	3,682	3,700	3,750
Mercury		88	63	54	40	45

See footnotes at end of table.

TABLE 1-Continued
FINLAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/		1996	1997	1998	1999 e/	2000 e/
METALS--Continued						
Nickel:						
Mine output, Ni content		2,136	3,252	1,967 r/	8,079 r/ 4/	2,600
Metal, electrolytic		28,815	34,228	46,200	51,948 r/ 4/	15,300
Platinum-group metals:						
Palladium	kilograms	182	180 e/	150 e/	150	150
Platinum	do.	62	60 e/	50 e/	50	50
Selenium metal	do.	42,000	28,000	28,000 e/	26,000	26,000
Silver metal	do.	32,506	32,500 e/	29,700 e/	31,500	23,600
Zinc:						
Mine output, Zn content		26,294	30,800 e/	30,700 e/	20,000	16,200
Metal		176,300	175,000 r/ e/	199,000 e/	225,200 r/ 4/	223,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	975	905	903	1,310 r/ 4/	1,350
Feldspar		40,265	40,000 e/	40,000 e/	40,000	40,000
Lime	thousand tons	394	400 e/	400 e/	305 r/ 4/	400
Nitrogen, N content of ammonia		5,107	6,000 e/	6,000 e/	6,000	6,000
Phosphate rock, apatite concentrate:						
Gross weight	thousand tons	667 r/	690 r/	716 r/	724 r/	700
P_2O_5 content	do.	246 r/	254 r/	260 r/	268 r/	250
Pyrite, gross weight	do.	813	950 e/	900 e/	800	800
Sodium sulfate	do.	29	30 e/	35 e/	30	30
Stone, crushed:						
Limestone and dolomite:						
For cement manufacture	do.	1,128	1,200 e/	1,200 e/	1,350 r/	1,300
For agriculture	do.	892	900 e/	900 e/	1,000 r/	1,000
For lime manufacture	do.	303	300 e/	300 e/	350 r/	350
Fine powders	do.	289	300 e/	300 e/	350 r/	350
Metallurgical e/	do.	2	2	2	1 r/	1
Total	do.	2,614	2,700 e/	2,700 e/	3,050 r/	3,000
Quartz silica sand	do.	31	30 e/	30	73 r/ 4/	70
Sulfur:						
S content of pyrite	do.	425	373 r/	430 e/	500	500
Byproduct:						
Of metallurgy	do.	291	307 r/	296	300	300
Of petroleum	do.	38	50 r/	40 e/	45	50
Total	do.	754	730 r/	766 e/	845	850
Sulfuric acid	do.	1,287	1,200 e/	1,200 e/	819 r/ 4/	800
Talc	do.	345	350 e/	350 e/	469 r/ 4/	360
Wollastonite		22,304	20,000 e/	22,000 e/	22,000	20,000
MINERAL FUELS AND RELATED MATERIALS						
Peat:						
For fuel use	thousand tons	7,000 r/	9,500 r/	1,700 r/	4,140 r/ 4/	7,000
For agriculture and other uses	do.	300 r/	600 r/	150 r/	1,595 r/ 4/	400
Petroleum refinery products	thousand 42-gallon barrels	83,000	76,643	83,370	83,000	80,000

e/ Estimated. r/ Revised.

1/ Table includes data available through June 19, 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ In addition to commodities listed, granite and soapstone are produced, but available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

TABLE 2
FINLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating copanies and major equity owners	Location of main facilities	Annual capacity
Apatite		Kemira Agro Oy (Government, 98%)	Mine and plant at Siilinjärvi	8,000
Ammonia		Kemira Oyj (Government, 98%)	Plant at Oulu	75
Cadmium, metal		Outokumpu Oyj (Government, 40% ; private investors, 12.3%)	Smelter at Kokkola	1
Cement		Finncement Oy (Irish Cement Ltd., 100%)	Plants at Lappeenranta and Parainen	1,020
Chromite		Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Mine at Kemi	1,000
Copper:				
Ore, Cu content		do.	Mines at Pyhäsalmi, Saattopora, and Hitura	10
Metal		do.	Smelter at Harjavalta	160
Do.		do.	Refinery at Pori	125
Feldspar		SP Minerals Oy (Partek Corp., 50.1%; SCR-Silbeco SA, 49.9%)	Mine and plant at Kemiö	50
Ferrochrome		Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Smelter at Tornio	250
Gold:				
Ore, Au content	tons	do.	Mine at Orivesi	4
Metal	do.	do.	Smelter at Pori	4
Ore, Au content	do.	Williams Resources Inc.	Pahtavaara Mine near Sodankyla	3
Limestone		Partek Nordkalk Oy (Partek Corp., 100%)	Mines at Lappeenranta, Pargas and Parainen	1,500
Do.		Rauma-Repola Oy	Mine at Tornio	300
Mercury	tons	Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Smelter at Kokkola	150
Mica		Kemira Oyj (Government, 98%)	Mine at Siilinjarvi	10
Nickel:				
Ore, Ni content		Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Mine at Hitura	3
Metal		do.	Smelter at Harjavalta	32
Do.		OM Group, Inc.	Refinery at Harjavalta	50
Petroleum products		Fortum Oil and Gas Oy	Plants at Naantali and Porvoo	NA
Phosphate-apatite		Kemira Oyj (Government, 98%)	Mine at Siilinjarvi	700
Do.		Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Mine at Pyhäsalmi	800
Quartz and quartzite		SP Minerals Oy (Partek Corp., 50.1%; SCR-Silbeco SA, 49.9%)	Mines at Kemio and Nilsia	250
Selenium	tons	Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Smelter at Pori	35
Silver	do.	do.	Smelter at Pori	30
Steel		Rautaruukki Oy (Government, 41.8%)	Plant at Raahe	2,100
Do.		Fundia AB (Norsk Jenverk AS of Norway, 50%; Rautaruukki, 50%)	Plants at Aminnefors, Dalsbruk, and Koverhar	850
Do.		Ovako Oy (SKF, 50%; Wartsila, 25%; Fiskas, 20%)	Plant at Imatra	600
Stainless		Outopkumpu Oyj (Government, 40%; private investors, 12.3%)	Plant at Tornio	500
Talc		Mondo Minerals Oy (Western Mining Corp. Holdings Ltd., 50%; Plüss-Staufer AG, 50%)	Mines at Lahnaslampi, Lipsavaara, and Horsmanaho	500
Wollastonite		Partek Minerals Oy (Partek Corp., 100%)	Mine at Lappeenranta	30
Zinc:				
Ore, Zn content		Outokumpu Oyj (Government, 40%; private investors, 12.3%)	Mine at Pyhäsalmi	25
Metal		do.	Smelter at Kokkola	175

NA Not available.

THE MINERAL INDUSTRY OF

FRANCE

By Harold R. Newman

France was a major European mineral producer despite traditional mineral industries being in a state of transition during the past few years. Prior to 2000, the heavy economic and political involvement of the state has been one of the main elements of the national mineral policy. The reduction of Government subsidies to support uneconomic mineral operations and the depletion of mineral reserves have had a significant impact on a number of extractive operations in the mineral industry.

Government Policies and Programs

Efforts have been made to promote the private sector and to reduce the dependence of state-owned companies on subsidies. The Government was proceeding with a program of privatization that required large state-controlled companies to reduce the direct role of the Government in their operations. International pressures of globalization and more direct pressure from the European Union (EU) were behind the trend away from Governmental involvement in industry.

Production

Mineral and metal industries generally maintained production and other activities at about the same or slightly decreased rates as those of 1999. Several industries, such as bauxite, coal, iron ore, and uranium, have steadily undergone changes during the past few years, especially bauxite, which is no longer mined. Some bauxite waste dumps were reprocessed; the resulting product was used by cement companies.

The coal and iron ore industries and other mineral producers were affected by cheaper foreign sources, high operating costs, and the depletion of domestic resources. Coal mining was directed by Charbonnages de France (a state-owned company).

The uranium industry reduced its operations by closing a number of mines and processing plants owing to low market prices and depletion of certain deposits. Some factors in the drop of uranium demand were the increased accessibility of petroleum and natural gas from the North Sea and the former Soviet Union (table 1).

Trade

France has a tradition of highly centralized administrative oversight of its essentially market-based economy. The Government maintained its efforts to focus the country's trading patterns toward the countries of the Organization for Economic Cooperation and Development while encouraging the development of new markets, particularly in Asia and Latin America. Strong commercial relations continued between France and the United States, and Germany remained France's largest export destination. In 2000, France was the ninth largest trading partner of the United States worldwide and the third largest trading partner in Europe after the United Kingdom and Germany and had the world's fifth largest industrial market. France adopted the euro currency as of January 1, 1999. Responsibility for the exchange rate was shared between the national Finance Ministry and the European Central Bank (U.S. Embassy, Paris, France, 2000, p. 7-15).

France's economy continued to grow, although growth has slowed in concert with other EU countries. The real gross domestic product was expected to grow by 3.5% in 2000. The indices of industrial production are listed in table 2.

Government and private companies produced minerals and mineral products, conducted research, and explored for new domestic and international mineral resources (table 3).

Commodity Review

Metals

Aluminum.—The proposed merger of Alcan Aluminium Ltd. of Canada, Pechiney Group of France, and Alusuisse Lonza Group (algroup) of Switzerland to form the world's largest aluminum company was terminated when Pechiney withdrew from the proposed merger. Pechiney stated that it had failed to reach an agreement that would satisfy the other two parties and the EU. This was to have been the biggest consolidation move in the international aluminum industry. The three-way merger would have created a company with revenues of about $17 billion per year and production of about 15% of the world's primary aluminum (Mining Journal, 2000).

The two-way merger agreement between Alcan and algroup remained in effect and would be completed through an exchange offer to algroup shareholders. The plan received approval by the European Commission; however, it is subject to approval by the U.S. Department of Justice and 67% of algroup shareholders. Alcan said the two-way combination would lead to cost synergies of $150 million within 24 months of completion (Metal Bulletin, 2000).

Gold.—Gold mining in France was mostly concentrated in Société des Mines du Bourneix's open pit and underground operations south of Limoges in the Saint Yrieix la Perche District and in Mines d'Or de Salsigne's underground Salsigne Mine near Carcassonne. The Salsigne Mine was in receivership and operating under the protection of the French courts.

Iron Ore.—The iron ore basin of northern France stretches from Lorraine northward into Belgium. The high phosphorus and low iron content of the ore limited its desirability, and production has been declining for several years. Terres Rouges Mine, which was the last iron ore mine in the Lorraine District, closed at the end of 1998. The mines of Lorraine once produced more than 50 million metric tons per year of iron ore.

Lead and Zinc.—Mining of lead and zinc has completely ceased in France. In 2000, two companies operated primary zinc plants by using imported ores and concentrates. Société des Mines et Fonderies de Zinc de la Vieille Montagne of Belgium operated a zinc refinery at Auby-les-Douai with a capacity of 210,000 metric tons per year (t/yr) of zinc. Métaleurop S.A. operated a 110,000-t/yr primary smelter and a 40,000-t/yr secondary smelter at Noyelles-Godualt (Société de l'Industrie Minérale, 2000d).

Steel.—Usinor Group produced about 21 million metric tons (Mt) of crude steel in 2000 and ranked third in the world as a producer of steel in terms of crude steel production and second in terms of sales from steelmaking activities, after Nippon Steel Corp. of Japan. Usinor's principal activities were divided into flat carbon steels, stainless steels and alloy, and specialty steels (Usinor Group, July 1, 2000, Usinor at a glance, accessed December 18, 2000, at URL http://www.usinor.com/ENGLISH/groupe/group_11.htm).

Uranium.—Compagnie Générale des Matières Nucléaires (the state-owned uranium mining company) was the country's major producer of uranium. France was the world's largest per capita nuclear power generator and ranked second in total installed nuclear capacity after the United States. About 80% of electricity generated in France came from 57 nuclear plants. This has changed dramatically since 1973 when fossil fuels accounted for more than 80% of power generation. France must decide whether to replace obsolete nuclear plants with more modern plants or to begin phasing out nuclear power (U.S. Energy Information Administration, December 2000, France—Country analysis brief, accessed August 1, 2000, at URL http://www.eia.doe.gov/emeu/cabs/france.html).

Industrial Minerals

Andalusite.—Denain-Anzin Minéraux Refractaire Ceramique (DAMREC) (a subsidiary of Imetal Group) was the only producer of andalusite in Europe. DAMREC's mining operation was in Glomel, Brittany, and produced about 70,000 t/yr (Société de l'Industrie Minérale, 2000a).

Barite.—The primary barite mining area is at Chaillac near Limoges. Barytine de Chaillac (a subsidiary of Solvay Barium Strontium GmbH of Germany) was the major producer with an open pit mine and plant at Chaillac. Barytine produced about 70,000 t/yr of flotation-grade barite that averaged 98% barium sulfate and was suitable for production of chemicals (Société de l'Industrie Minérale, 2000b).

Cement.—Lafarge SA and Société des Ciments Français were the two largest producers of cement in France. Each company had control of approximately one-third of the domestic market. Lafarge was the world's second largest producer of cement, after Holderbank Financière Glaris Ltd. of Switzerland, with 100 plants in 32 countries (Lafarge, [undated], Cement, accessed December 19, 2000, via URL http://www.lafarge.com).

Lafarge raised its bid for Blue Circle Industries plc of the United Kingdom to $5.8 billion. Blue Circle renewed its rejection of the bid, which has been increased by more than 7%. If Lafarge is successful in its acquisition attempt, then it would move the merged company into top position in the $80 billion-plus cement market ahead of Holderbank. It would also lead to another long-established United Kingdom-based company passing into foreign hands (Batchelor, 2000).

Fluorspar.—Société Générale de Recherches et d'Exploitation Minières (SOGEREM), which was the main producer of fluorspar with three open pit mines in the south of France, accounted for more than 60% of fluorspar production. The fluorspar vein deposits are found in the Hercynian massifs, the Massif Central, the Vosges, the axial zone of the Pyrénées, and the outer Alps. SOGEREM's mining operations supplied Comifluor S.A., which operated a plant at Bastîde-a-Olette. This plant produced acid-grade fluorspar, 97% calcium fluoride, and electrical-grade fluorspar. The Escardo Mine, which was owned by Denain-Anzin Minéraux S.A., also shipped crude ore from its surface mining operation to the Olette plant for processing (Groupe Minéral Harwanne Marketing Department, 1999).

Gypsum.—France was one of Europe's largest producers of gypsum. Two-thirds of the production was from the Paris Basin. Four companies produced about 95% of the output. S.A. de Materiel de Construction was the largest company.

Kaolin.—Kaolin deposits in the granite massifs in Brittany were the ones most actively mined in France. The largest mine, which was operated by La Source Compagnie Minière, was in the Kaolin d'Arvor deposit near Quessoy. The mine had a capacity of 300,000 t/yr. The second largest operation was Société Minière des Kaolin Du Moribihan's (SMKDM) open pi mines at Lanvrian and Kerbrient, with capacities of 80,000 t/yr of kaolin and 10,000 t/yr of mica. The third largest operation was Société des Kaolins du Finistères's (SKF) 30,000 t/yr capacity operations at Berrien. Groupe Mineral Harwanne owned SKF and SMKDM (Société de l'Industrie Minérale, 2000c). The kaolin was used mostly in the paper and the ceramic industries. Ball and refractory clays were mined in the Charante Basin to the southwest.

Potash.—Mines de Potasse d'Alsace S.A. was the principal producer of potash with two underground mines—Marie-Louise and Amélie—located near Mulhouse, Alsace. It was a significant supplier of potash salts. The main products were potash ore, which was concentrated to 62% potassium oxide material, bromine, rock salt for snow clearing, and other industrial products (Société de l'Industrie Minérale, 2000e).

Talc.—Talc de Luzenac S.A. was significant not only to the domestic market, but also to the European market. Borax Français S.A. (a subsidiary of Rio Tinto Corp.) purchased 92% of Talc de Luzenac. As a result of mergers and acquisitions over the past 6 years, Talc de Luzenac was formed as a subsidiary of Rio Tinto. Talc de Luzenac operated 16 deposits and 20 processing plants in Europe and North America and was the leading talc producer in the world (Société de l'Industrie Minérale, 2000f).

Mineral Fuels

Coal.—In 2000, all underground coal mines were closed in the Midi-Pyrénées area and in the Nord Pas-de-Calais Basin.

CdF was proceeding with further restructuring that would result in reduced production. The rest of the mines, with the exception of those in the Lorraine area, were closed by yearend 2000. The three deep mines still active in Lorraine, La Houve, Reumaux, and Vouters were expected to close after 2000. Four open pit mines in the Centre-Midi Basin were still being worked mostly for lignite. CdF envisioned the final stoppage of all coal mining in France by 2005 in accordance with the National Coal Pact signed in 1994 (European Commission, September 20, 2000, State aid to the French coal industry, accessed February 5, 2001, via URL http://www.europa.eu.int).

Natural Gas.—State-owned monopoly Gaz de France announced that it would comply with the EU directive to open the gas market to competition. France chose to open its market to the strict minimum allowed under the EU directive—20% of the total market—rising to a third of the total market by 2008. France was one of the last EU members to comply with the directive; only Germany and Luxembourg lagging behind (Alexander's Gas and Oil Connections, October 4, 2000, France to open its gas market, accessed October 8, 2000, at URL http://www.gasandoil.com/goc/news/nte03698.htm).

Petroleum.—In 2000, onshore petroleum production was mainly from the Aquitaine and the Paris Basins. Because production had started to decline in these areas, the Government initiated a program to encourage exploration for new deposits in other areas thought to have potential; the Jura Basin was one area under consideration.

Companies that operated refineries in France included BP Amoco plc, Mobil Corp., Royal Dutch Shell Group, and Total/Elf, as well as other smaller companies. The structure of the industry was geared to gasoline production. Refining was mainly focused on the high-octane unleaded gasoline used by a majority of the vehicles in France.

Because refining units have been capable of processing heavy fuels and no hydrocracked feedstocks were available for the production of gas, the process stream was short on middle distillates and naphtha. France was a net importer of petroleum products.

Outlook

Having one of the world's most developed economies, France was an advocate for the EU and the European single-market concept. The country has had to make considerable changes in the structure of its industries, particularly those mineral industries controlled by the state. Several state-owned companies have taken the initiative to become leaders in their respective industries. Others have been forced to make additional adjustments under restructuring schemes proposed by the EU or the French Government. The depletion of mineral resources and the cessation of subsidies for uneconomic operations have had impacts on local communities and their economies. France will have the advantage of plentiful electrical power to attract industrial facilities that require skilled work forces and good access to markets in Europe.

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Major Sources of Information

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  Avenue de Concyr - BP 6009
  45060 Orleans, cedex 2, France
Ministere de l'Industrie
  DGEMP SMPSS
  101 Rue de Grenelle
  75353 Paris, France

TABLE 1
FRANCE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/		1996	1997	1998	1999 e/	2000 e/
METALS						
Aluminum:						
Bauxite, gross weight 4/	thousand tons	81	164	165 e/	160	100
Alumina:						
Crude	do.	550	570	570 e/	550	500
Calcined	do.	440	450	450 e/	450	400
Metal:						
Primary	do.	386	399	424	455 5/	441 5/
Secondary	do.	236	242	240 e/	239 5/	270 5/
Antimony metal, including regulus		520	650	600 e/	500	500
Cadmium metal		92	309	177 r/	195 5/	160 5/
Cobalt metal:						
Powder		580	670	600 e/	600	600
Chloride		174	159	172 e/	175 r/ 5/	204 5/
Copper:						
Mine output, Cu content		170	196	180 e/	100	100
Metal:						
Blister, secondary e/		2,300	1,490	1,079	1,000	1,000
Refined:						
Primary		10,500	5,800 e/	--	--	--
Secondary e/		28,600	29,800	22,400	1,800	1,500
Total		39,100	35,600	22,400 e/	1,800	1,500
Gold, mine output, Au content	kilograms	5,651	4,953	3,793	3,570	2,632 5/
Iron and steel:						
Iron ore and concentrates:						
Gross weight	thousand tons	1,464	523	100	--	--
Fe content	do.	430	145 e/	28	--	--
Metal:						
Pig iron	do.	12,108	13,424	13,603	13,854	13,661 5/
Ferroalloys:						
Blast furnace, spiegeleisen and ferromanganese		281	326	321 e/	302 5/	300
Electric furnace:						
Ferromanganese e/	thousand tons	100	100	100	138 r/ 5/	140
Ferrosilicon	do.	103	109	110 e/	100	110
Silicon metal	do.	74	66	65 e/	65	60
Other (Si, Ca, Mg)	do.	114	94	95 e/	100	100
Total		672	695	691 e/	705 r/	710
Steel, crude	do.	17,630	19,773	20,241	20,211 5/	21,002 5/
Steel, hot rolled	do.	16,224	17,975	16,822	17,294 r/ 5/	17,722 5/
Lead:						
Smelter, secondary e/		241,100	218,500	208,000	205,000 5/	209,000 5/
Refined:						
Primary		140,750	137,500	146,000 e/	124,000	100,000
Secondary		162,000	164,800	172,000	155,000	158,000
Total		302,750	302,300	318,000	279,000	268,000
Magnesium metal, including secondary		14,000	13,740	14,700	14,000	14,000
Nickel metal 6/		9,070	8,750	9,778	9,458 r/	10,100 5/
Silver: e/						
Mine output, Ag content	kilograms	1,550	1,770	1,027	1,140	720 5/
Metal, Ag content of final smelter products	do.	650	535	550	500	500
Tin, secondary		4,410	3,810	2,926	1,506	1,257 5/
Tungsten, powder		670	680	600 e/	500	500
Uranium:						
Mine output, U content		841	579	468 r/	625 r/	302 5/
Chemical concentrate, U_3O_8 equivalent		713	487	453 r/	424 r/	318 5/
Zinc metal, including slab and secondary		324,300	317,151	329,019	331,103 5/	350,100 5/
Zirconium, sponge		1,550	1,870	1,800 e/	1,600	1,500
INDUSTRIAL MINERALS						
Barite, $BaSO_3$ equivalent		76,000	77,000	75,000 e/	76,000	51,000 5/
Bromine, elemental e/		2,020	1,980	2,000	8,000	7,900 5/
Cement, hydraulic	thousand tons	18,340	19,780	19,000 e/	19,527 5/	20,000
Clay, kaolin and kaolinitic clay (marketable)	do.	326	332	333 e/	330	380 5/
Clay, refractory, unspecified	do.	14	13	14 e/	14	12

See footnotes at end of table.

TABLE 1--Continued
FRANCE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/		1996	1997	1998	1999 e/	2000 e/
INDUSTRIAL MINERALS--Continued						
Diamonds, synthetic, industrial e/	thousand carats	3,500	3,600	3,600	3,600	3,600
Diatomite e/	thousand tons	80	80	80	75	75
Feldspar, crude e/	do.	546	621	706	638	642 5/
Fluorspar:						
Crude	do.	295	236	250 e/	250	250
Marketable:						
Acid and ceramic-grade	do.	78	84	85 e/	86	85
Metallurgical-grade	do.	33	22	20 e/	20	20
Total	do.	111	106	105 5/	106 5/	105 5/
Gypsum and anhydrite, crude	do.	4,550	4,500	4,500 e/	4,500	4,500
Kyanite, andalusite, related materials e/	do.	70	67	70	70	65
Lime, quick and hyrated, dead-burned dolomite e/	do.	2,714	2,360	3,106	3,094	3,000
Mica e/		10,000	8,000	10,000	10,000	10,000
Nitrogen, N content of ammonia	thousand tons	1,850	1,757	1,570 e/	1,580 r/	1,700
Pigments, mineral, natural, iron oxide e/		1,000	2,200	2,000	1,500	1,500
Phosphates, Thomas slag	thousand tons	77	44	50 e/	50	50
Potash, K2O equivalent (marketable)	do.	760	725	453	345	360 5/
Pozzolan and lapilli e/	do.	400	477	460	450	450
Salt:						
Rock salt e/	do.	160	371	300	100	100
Brine salt (refined)	do.	1,460	1,475	1,500 e/	1,730	1,774 5/
Marine salt	do.	970	1,188	1,200 e/	900	1,000
Salt in solution	do.	4,273	4,051	4,000 e/	4,050	3,956 5/
Total	do.	6,863	7,085	7,000 e/	6,787	6,830
Sodium compounds: e/						
Soda ash	do.	1,106	1,053	1,000	1,000	1,000
Sodium sulfate	do.	124	120	120	120	120
Stone, sand and gravel: e/						
Limestone, agricultural and industrial	do.	9,200	11,433 5/	11,000	11,000	12,000
Slate, roof	do.	26	31	30	30	30
Sand and gravel:						
Industrial sands	do.	6,550	6,560 5/	6,500	6,500	6,500
Other sand, gravel and aggregates	do.	159,000	164,000	165,000	165,000	165,000
Sulfur, byproduct:						
Of natural gas	do.	755	697	600	600	600
Of petroleum	do.	235	263	245	250	250
Of unspecified sources	do.	99	236	261	250 r/	250
Total e/	do.	1,090	1,200	1,100	1,100 r/	1,100
Talc:						
Crude		349,270	362,000	391,000	405,300	350,000
Powder e/		320,970 5/	300,000	300,000	300,000	300,000
MINERAL FUELS AND RELATED MATERIALS						
Asphaltic material e/		28,500	23,000	24,000	24,000	24,000
Carbon black e/		247,000	253,000	250,000	250,000	250,000
Coal, including briquets:						
Anthracite and bituminous	thousand tons	7,312	5,779	5,300	4,033 r/ 5/	3,166 5/
Lignite	do.	939	690	800	894 r/ 5/	297 5/
Total	do.	8,251	6,469	6,100	4,927 r/ 5/	3,463 5/
Briquets e/	do.	256 5/	250	250	163 5/	200
Coke, metallurgical e/	do.	3,850 5/	3,900	4,000	5,312 r/ 5/	5,327 5/
Gas, natural, marketed e/	million cubic meters	2,815 5/	2,800	2,600	2,500	1,040 5/
Petroleum:						
Crude	thousand 42-gallon barrels	15,339	13,104	13,000 e/	13,380 r/ 5/	13,476 5/
Refinery products: e/						
Liquefied petroleum gas	do.	32,155 5/	34,324 5/	34,000	29,012 r/ 5/	30,937 5/
Gasoline, all kinds	do.	141,524 5/	145,954 5/	145,000	146,855 r/ 5/	132,107 5/
Kerosenes and jet fuel	do.	45,000	53,656 5/	54,000	52,948 r/ 5/	48,872 5/
Distillate fuel oil	do.	200,000	260,000	260,000	238,451 r/ 5/	250,417 5/
Residual fuel oil	do.	78,000	70,000	76,000	59,121 r/ 5/	57,776 5/
Other products	do.	40,000	125,000	100,000	46,872 r/ 5/	46,179 5/
Refinery fuel	do.	1,000	1,000	1,000	868 r/ 5/	1,148 5/
Total	do.	538,000 r/	690,000 r/	670,000 r/	574,127 r/ 5/	567,436 5/

See footnotes at end of table.

TABLE 1--Continued
FRANCE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through July 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ In addition to the commodities listed, France also produces germanium from domestic ores. Unfortunately, actual output is not regularly reported. France also produces large amounts of stone, but statistics on output are not available.

4/ Reprocessed bauxite not for metallurgical use.

5/ Reported figure.

6/ Excludes secondary production from nickel/cadmium batteries.

TABLE 2
FRANCE: SELECTED INDICES OF PRODUCTION

(1990 = 100)

Sector	1997	1998	1999	2000 e/
General	106	112	114	119
Mining	74	73	75	76
Manufacturing	105	111	114	118
Electricity and gas	120	122	124	131

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no. 12, December, p. 26.

TABLE 3
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of facilities	Annual capacity
Alumina		Aluminium Péchiney	Plant at Gardanne	700
Aluminum		do.	Aluminum smelters at:	
			Saint-Jean-de-Maurienne, Savoie Province	120
			Noguères, Pyrénées, Atlantiques Province	115
			Lannemezan, Hautes-Pyrénées Province	63
			Auzat, Arièege Province	44
Andalusite		Denain-Anzin Minéraux Refractaire Ceramique	Glomel Mine, Brittany	75
Antimony, metal		Société Nouvelle des Mines de la Lucette	Plant at Le Genest, Mayeene Province	10
Barite		Barytine de Chaillac	Mine and plant at Chaillac, Indre Province	150
Do.		Société Industrielle du Centre	Mine at Rossigno, Indre Province	100
Bauxite		Aluminium Péchiney	Mines in Var Province (closed)	900
Do.		Société Anonyme des Bauxites et Alumines de Province	do.	400
Cadmium	tons	Compagnie Royal Asturienne des Mines	Plant at D'Auby-les-Douai, Nord Province	200
Cement		Eight companies, of which the largest are:	80 plants, including--	23,233
		Cement Lafarge France	15 plants, largest at:	7,815
			St. Pierre-la-Cour	(1,160)
		Société des Ciments Français	13 plants, largest at:	6,190
			Gargenville	(1,100)
Coal		Charbonnages de France (CdF) including:		13,000
		Bassin de Centre-Midi	Mines and washeries in middle France	(2,500)
		Bassin de Nord-Pas-de-Calais	Mines and washeries (closed)	(1,000)
		Bassin de Lorraine	Mines and washeries in eastern France	(9,500)
Cobalt, metal	tons	Société Métallurgique Le Nickel (SLN)	Plant at Sandouville, near Le Havre	600
Copper, metal		Compagnie General d'Electrolyse du Palais	Electrolytic plant at Palais-sur-Vienne	45
Do.		Société Française d'Affinage du Cuivre	Smelter at Poissy	11
Do.		Affinerie Sud-Ouest	Refinery at Toulouse	2
Feldspar		Denain-Anzin Minéraux S.A.	Mine and plant at St. Chély d'Apcher	55
Ferroalloys		Société du Ferromanganese de Paris, Outreau	Plant at Boulogne-sur-Mer	420
Do.		Péchiney Electrométallurgie	Plants at Bellegarde	387
Do.		Chromeurope S.A.	Plant at Dunkerque	25

TABLE 3--Continued
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY FOR 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of facilities	Annual capacity
Fluorspar	Société Générale de Recherches et d'Exploitation Minière (SOGEREM)	Mines in southern France	150
Gold kilograms	Société des Mines du Bourneix (Government)	Mines in the Saint Yrieix la Perche District	4,000
Do. do.	Mines d'Or de Salsigne (Eltin Co., 51%; Ranger Co., 18%; Peter Hambro Plc., 10%)	Mine near Carcassonne	3,000
Gypsum	S.A. de Materiel de Construction	Mine at Taverny	1,500
Iron and steel:			
Iron ore	Acieries Reunies de Burbach-Eich-Dudelang (ARBED)	Mine at Terres Rouges, Bassin de Lorraine, eastern France (closed 1999)	8,000
Steel	Usinor-Sacilor	Dunkerque	7,500
Do.	do.	Fos-sur-Mer	4,200
Do.	do.	Seramange	3,000
Do.	Sollac, Unimetal (Usinor-Sacillor, 100%)	Gadrange, Neuves Maisons, and Thonville	8,400
Kaolin	La Source Compagnie Minière	Kaolin d'Arvor Mine, Quessoy	300
Lead, metal	Métaleurop S.A.	Imperial smelter, Noyelles Godault	110
Magnesium, metal	Société Française d'Electro-Metallurgique	Plant at Marignac, Haute Garonne	14
Natural gas million cubic meters	Société Nationale Elf Aquaitane (SNEA)	Gasfield and plant at Lacq	20,000
Nickel, metal	Société Métallurgia le Nickel (SLN)	Plant at Sandouville	16
Petroleum:			
Crude barrels per day	Société National Elf Aquaitane (SNEA)	Paris Basin oilfields	1,000
Refined do.	Compagnie Française de Raffinage (TotalFina)	Refineries at Gonfreville and La Mede	446,000
Do.	Shell-Française	Refinery at Petite Couron	285,000
Do.	do.	Refinery at Berre	270,000
Do.	Elf Aquaitane-France	Refinery at Feyzin	120,000
Do.	do.	Refinery at Donges	200,000
Do.	do.	Refinery at Grandpuits	96,000
Do.	Société Française British Petroleum (S.F.B.P.)	Refineries at Lavera	175,000
Do.	Esso S.A.	Refineries at Fos-sur-Mer	237,000
Do.	Mobil Oil Française	Refineries at Gravenchon	62,000
Do.	Cie. Rhenane de Raffinage (CRR)	Refinery at Reichstett	80,000
Potash, K_2O	Mines de Potasse d' Alsace S.A. (MDPA)	Mines at Amélie and Marie-Louise, in Alsace	10,000
Salt, rock	Compagnie des Salins du Midi et des Salines de l'Est	Varangeville Mine at Saint-Nicolas-de-Port	9,000
Sulfur	Société Nationale Elf Aquaitane (SNEA)	Byproduct from natural gas, Lacq plant	3,000
Talc	Talc de Luzenac S.A. (Rio Tinto Corp., 100%)	Trimons Mine near Ariège, Pyrenees	350,000
Uranium, U_3O_8 tons	Compagnie Général des Matèrials Nucleaires (COGEMA) (Government)	Mines at Limousin, Vendee, and Hérault	1,800
Zinc, metal	Société des Mines et Fonderies de Zinc de la Vieille Montagne (VM)	Electrolytic plant, Auby-les-Douai	210

THE MINERAL INDUSTRY OF

GERMANY

By Harold R. Newman

In 2000, Germany enjoyed the fastest real annual economic growth it had experienced since its reunification. Stronger export demands from outside Western Europe resulting from the world economic recovery, industrial investment, and productivity increases were contributing factors to the economic growth. The gross domestic product (GDP) grew by about 2.8%. Germany's economy remained the largest in Europe, equivalent to slightly more than $2 trillion, and accounted for more than 25% of the European Union's (EU) economy. Unemployment continued to be a problem and averaged about 9.7% of the labor force. The top priorities of the Government were to maintain economic growth and to continue the development of the five Laenders (States) that make up eastern Germany. These areas were still dependent upon huge net resource transfers from the west via a variety of Federal and State social payments, entitlement and investment grants, and tax waiver incentives for investment and trade (U.S. Embassy, Berlin, Germany, 2001).

Government Policies and Programs

The Government's declared primary objective was to stimulate economic growth and employment and to get a grip on rising government debt. To this end, the Government was pursuing a combination of budget consolidation, growth incentives, and structural reform. Although the state intervenes in the economy through the provision of subsidies to selected sectors and the ownership of some segments of the economy, competition and free enterprise are promoted as significant segments of government policy.

Germany was one of the main supporters of European unification and a strong advocate of closer European economic integration. Its economic and commercial policies were increasingly determined by agreements among EU members. In harmony with the Schengen Agreement, which became effective on March 26, 1995, most of the EU member states, which included Germany, agreed to discontinue border controls. This internal market has provided a boost for Germany's export-oriented economy, as well as for the economies of other European countries.

On April 29, 1998, new energy legislation designed to introduce competition to the traditionally closed electricity and natural gas sectors came into force. The legislation, among other things, abolished utilities-demarcated monopoly supply areas and created a framework for third-party access to electricity grids and natural gas pipelines. Lignite (brown coal) mining in Germany will be protected from competition as late as 2005. Germany is the world's largest lignite producer with about one-fifth of global output. Renewable and cogeneration plants are given special significance under the new legislation (U.S. Energy Information Administration, November 2000, Germany, accessed November 16, 2000, at URL http://www.eia.doe.gov/emeu/cabs/germany.html).

In April 1998, Germany's constitutional court cleared the way for German membership in the European Monetary Union (EMU), and on April 23, 1998, Germany's Parliament (the Bundestag) voted to join the European single currency zone. The EMU began the process of creating a single European currency, referred to as the euro (€), by irrevocably setting the exchange rates of individual member states on January 1, 1999. Individual member-states' currencies including the German deutsche mark (DM) are to be phased out by February 28, 2002 (U.S. Energy Information Administration, December 2001, Germany, accessed December 28, 2001, at URL http://www.eia.doe.gov/emu/cabs/germany.html).

Environmental Issues

The environment in Germany is the responsibility of the Federal Ministry for the Environment, Water Conservation and Nuclear Safety. Falling within its purview is the Federal Environment Agency in Berlin, the Federal Office for Nature Conservation in Bonn, and the Federal Office for Radiation Protection in Salzgitter.

Environmental concerns that relate to mining are addressed under the Federal mining law and its provisions for environmental impact assessments that must be completed before mining can start. The objective of the assessment is to identify and evaluate all environmental consequences of a planned project by taking into account various design options. The environmental evaluation process in Germany presents a risk for the company involved because, even after completion of the assessment, which usually involves considerable time and resources, project approval is not guaranteed.

Following the reunification of the country, the major task of energy and environmental policy was to merge the radically different systems of the former German Democratic Republic (GDR) and the Federal Republic of Germany (FRG). The FRG had a diversified and mainly privately owned system of energy supply and a commitment to environmental protection. In contrast, the GDR's energy sector was highly centralized, predominantly state-owned, dependent on lignite as its primary fuel, and a major domestic source of air pollution. Lignite mines were either closed or retrofitted with gas-desulfurization equipment (U.S. Energy Information Administration, November 2000, Germany, accessed November 16, 2000, at URL http://www.eia.doe.gov/emeu/ cabs/germe.html).

Germany's air quality had also suffered owing to the country's geographic proximity to the highly polluting centrally planned economies of the Soviet bloc. Emissions that caused acid rain and damaged forests blew over Germany. With the breakup of the Soviet bloc, this region is now polluting less owing to stricter emission controls, a downturn in production, and an orientation toward processes that cause less pollution.

This has improved Germany's air quality.

Production

The minerals and metals industry, which included industrial processing, construction, and mining, contributed almost 1% to the GDP. Production in the mining and metals industries depended on a variety of factors that included the availability of materials and supply and demand. The easing of the worldwide recession was a positive factor for those industries that depended on exporting their products. The importance of certain sectors of the German mining industry has decreased steadily during the past decades. Notwithstanding the general contraction of the industry, the production levels of certain minerals remain important domestically and on a worldwide scale. Even though its underground mining sector has shrunk significantly in recent years, Germany has remained a world leader in the mining equipment manufacturing sector. The high costs of production in Germany compared with those of competing foreign producers and the problems caused by trying to balance production between the merged GDR and FRG helped constrain production (table 1). The indices of production are listed in table 2.

Trade

Foreign trade was a key element in Germany's economic life with one-third of national output going to external markets. After the United States, Germany had the largest foreign trade volume in the world and was the world's third largest economy. Two-way United States-Germany trade was worth more than $80 billion in 2000. Outside the EU, the United States and Japan, respectively, were Germany's major trading partners (Bureau of Economic and Business Affairs, 2001).

Germany, a major processing nation, relied mainly on imports to feed the metals processing industry, which transformed raw materials into products that supplied the manufacturing industry and provided the bulk of the country's exported materials. In 2000, German imports of mineral and energy commodities (fuels, metals, nonmetals, precious metals, and precious stones) totaled $57 billion.[1] Demand for iron ore in 2000 was met by imports of more than 47 million metric tons (Mt). Most of the demand for ferroalloys was met by imports. The nonferrous metallurgical industry provided its raw materials by imports and recycling. Supply of precious metals originated from domestic nonferrous refineries, domestic supply of scrap, and imports of wrought metal and scrap. German consumption of nonferrous metals (aluminum, copper, lead, tin, and zinc) amounted to almost 4 Mt (Bundesanstalt für Geowissenschaften und Rohstoffe, 2000, p. K-4).

With the exception of potash and rock salt, feldspar is the sole industrial mineral for which Germany is independent from imports. In 2000, Germany's import dependence on other industrial minerals was as follows: 35% for kaolin and bentonite and 70% for barite and natural graphite (Bundesanstalt für Geowissenschaften und Rohstoffe, 2000, p. K-5).

The restructuring of the German steel industry has resulted in a reduction in steel production capacity. This led to a drop in imported raw materials, especially iron ore and coking coke, which previously represented a large sector of the dry bulk tonnage processed through the country's leading ports. Coupled with this, the planned closure of Germany's loss-making coal mines has been slower than anticipated, postponing the estimated increase in demand for steaming coal imports (Bulk Materials International, 2001).

While 2000 did not see a major growth in coal imports, it did see a big shift in sourcing, with more than 800,000 metric tons (t) more hard coal coming from Australia, more than 400,000 t more from China, more than 300,000 t more coming from Poland, and nearly 230,000 t coming from the Commonwealth of Independent States. Major losers have been coal imports from the South Africa (down by 890,000 t), from Columbia (down by 334,000 t), and from the United States (down by 179,000 t) (International Bulk Journal, 2000).

Structure of the Mineral Industry

The structure of the industry in Germany and the principal companies operating in the production and processing of metals and minerals are listed in table 3. Most of the producing and processing facilities still in operation were small compared with those in the former FRG, except for lignite and potash, both of which were very large operations. The restructuring and privatization of the facilities in the former GDR continued in 2000. The Interest Management Association (Treuhandanstalt) retained control of some of the companies until they were sold or closed.

Commodity Review

Metals

Aluminum.—In 2000, Germany's primary aluminum industry was the largest in the EU, although it was considered to be medium sized when compared with other world producers. VAW Aluminium AG (a member of VIAG Group) accounted for more than 75% of the country's primary aluminum production. VAW's wholly owned aluminum smelters in Germany and its participating interests in smelters abroad ensured the supply of input metal for the company's downstream fabricating operations.

The bidding process was underway for Alcoa Inc.'s stake in Aluminium Oxid Stade GmbH's alumina refinery, and the company was on course to divest its interest by the deadline set by the European Commission (EC). Pechiney Group of France and VAW were the main bidders; however, several chemical companies were reported to be interested and were in the bidding process. The divestment is still subject to an EC investigation into market share for alumina trihydrate (Metal Bulletin, 2000a).

Arsenic.—Metaleurop Handel GmbH increased its production of high-purity arsenic by 50%. High-purity arsenic is used in the production of gallium arsenide, which is a key component in semiconductors as well as in opto-electronics. Metaleurop's high-purity metals sector focuses on the production of arsenic, germanium, and indium for technology purposes (Metal Bulletin, 2000b).

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[1] Where necessary, values have been converted from German deutsche marks (DM) to U.S. dollars ($) at the rate of DM2.23=US$1.00.

Copper.—Norddeutsche Affinerie AG (NA) acquired secondary copper producer Hüttenwerke Kayser AG (HK). NA operated a custom smelter and refinery at Hamburg and was the world's fifth largest custom copper smelter with production of about 360,000 metric tons per year (t/yr) of copper cathode, 320,000 t/yr of copper rod, and 176,000 t/yr of copper billets and cake. HK produced about 180,000 t/yr of cathodes from scrap. NA started construction of a new smelter at the Hüttenwerke recycling operation in Luenen that was scheduled to be completed by February 2002. A wider spectrum of materials can be accepted by the new operation (Mining Magazine, 2000).

Magnesium.—A group of secondary aluminum producers made up of Aluminiumschmelzwerk Oetinger GmbH, BAS Brinker Aluminium-Schmelzwerk GmbH, and Hannoversche Salzschlacke-Entsorgungs GmbH was planning to set up a new company, MR Magnesium-Recycling GmbH, that would specialize in recovering magnesium from residues and scraps. The decision to develop proprietary technology and to construct a specialized magnesium plant came as a result of an increase in magnesium alloy scrap received by secondary aluminum companies. Much of the increase resulted from the automobile companies BMW, Mercedes Benz, and Volkswagen changing from aluminum alloy to magnesium alloy for car manufacturing. The group believed that automobile companies would become major consumers of magnesium alloys (Magnesium Monthly Review, 2000).

Steel.—Europe's steel industry may look patchy to some observers, but it is the most consolidated in the world. Usinor Group [24-million-metric-tons-per-year (Mt/yr) capacity], Corus Group (22.9-Mt/yr capacity), Arbed Group (22.4-Mt/yr capacity), Thyssen Krupp Group (18.9-Mt/yr capacity), and the Riva Group (14-Mt/yr capacity) account for more than Mt/yr of raw steel capacity, which is about half of the EU total. Acquisitions and consolidations have created global players without adding to overall capacity (Metal Bulletin Monthly, 2000).

European steelmakers made very few advances in the field of direct-reduced iron (DRI). The lack of interest would appear to be the success of the blast furnace. Though centuries old, the technology encased in the blast furnace has yet to be surpassed. Even after installation costs, depreciation, and high replacement costs, the blast furnace still appears to be the cheapest source of high quality iron units. Ispat International N.V.'s minimill in Hamburg was the only plant making DRI in Western Europe, Ispat International N.V., [undated], Ispat Hamburger Stahlwerke GmbH, accessed August 30, 2000, at URL http://www.ispat.co.uk/).

The parent company of Europe's fourth largest steel producer and the world's largest stainless steelmaker, Thyssen Krupp Group, has abandoned plans to sell its steel division. The company said it would keep steel on as one of its six core operating units. As the unit with the highest turnover, steel would resume its core position in the group along with the automotive, elevators, investment, materials, and services units (Metal Bulletin, 2000d).

Thyssen Krupp Stahl AG (TKS) signed finance contracts for the construction of a new coke plant at its integrated steelworks in Duisberg. TKS needs the new plant to replace capacity lost at its existing aging coke plant. Under pressure from local residents to reduce emissions, the company closed down its three oldest batteries in 1999, halving production to a level of 1 Mt/yr from the three remaining operational batteries. When the new coke plant comes on-stream, it will produce about 70% of the steelwork's needs. At that point, the three batteries left operating will be closed (Metal Bulletin, 2000e).

Separately, TKS started construction of a new hot-dip galvanizing line at its Dortmund works. Part of an investment program to boost coated sheet production, the 350,000-t/yr-capacity line is scheduled to go into full production in 2001 (Metal Bulletin, 2000f).

Metaleurop S.A. sold its German galvanizing operations, consisting of 13 galvanizing plants, to the Kopf Group. The move was part of Metaleurop's general strategy to focus on its three core businesses; lead, precious metals, and zinc. The sale made Kopf one of Europe's leaders in galvanizing (Metal Bulletin, 2000c).

Preussag Stahl AG was a steel producer that supplied specially welded large pipes for long-distance petroleum and natural gas pipelines as well as flats and beams. Built to advanced technological standards, the Preussag electric steelworks, which had been brought on-line in Peine in late 1997, had a capacity of 750,000 t/yr.

Uranium.—The ongoing cleanup of the former Soviet Union uranium mining operations in the former GDR was viewed as Europe's biggest mine rehabilitation project. When the Wismut Mines were in production, the only goal was to maximize uranium output. This resulted in an environmental problem of monumental proportions. At various sites, 48 waste rock piles cover a surface area of about 15 square kilometers (km^2) that contain about 311 million cubic meters of waste material. In addition, 14 tailing ponds contain 160 million cubic meters of residues from uranium-ore-processing plants and cover a surface area of 7 km^2. The German Government was expected to spend more than $9 billion on this rehabilitation project during the next 10 to 15 years (Engineering and Mining Journal, 1999). Continuing remediation work in 2000 focused on decommissioning facilities and immobilizing contaminated material in a manner that would limit long-term hazards to humans and the environment.

Zinc.—Metallgesellschaft AG (MG) was negotiating to sell its Ruhr-Zink GmbH zinc refinery in Datteln. The refinery was reported to have been operating at only half capacity at the end of 1999. The move follows the sale of MG's other zinc products subsidiary Rheinzink GmbH in October 1999 to Grillo-Werke AG. MG reported the sales were a part of a "portfolio optimization" strategy, which involved MG focusing on the engineering and chemicals sectors. The company has virtually nothing more to do with metals. In keeping with that, MG plans to change its name to Mg Technologies AG (Mining Journal, 2000).

Industrial Minerals

Bentonite.—In terms of overseas developments, Süd-Chemie AG was the largest bentonite producer in Europe. The company controlled or had part shares in companies in France, Indonesia, Mexico, the Republic of Korea, Turkey, and the United States.

Süd-Chemie's main business was in Gammelsdorf, Bavaria, where it produced calcium, sodium, and acid-activated bentonite products.

Cement.—The Treuhandanstalt sold the former GDR's cement operations to mostly German or other Western European companies. A number of these plants were being extensively modernized and upgraded for more cost-efficient production.

The slowdown of construction in the latter half of 2000 affected the cement sector. Cement used for infrastructure projects has passed the "cement-intensive phase"; thus, a drop in domestic consumption was expected in the near term. However, a reduction in imports was expected to help the domestic market. Many German cement producers hold a fair amount of spare capacity that has to turn at least once a year in order to maintain operating permits, since permits for new kiln capacity are regarded as virtually impossible to obtain (The Global Cement Review, 2000).

Clays.—Between 140 and 160 small- to medium-sized clay mines were in operation in 2000 in Germany. About one-half of the high-quality refractory and ceramic clays produced were from the Rhineland-Palatinate area. Production in Bavaria was concentrated in the Oberfalz area.

Germany was the second largest producer of kaolin in Western Europe after the United Kingdom. Most of the German kaolin was mined in Bavaria, and Amberger Kaolinwerke GmbH was the largest producer with mines in Hirschau.

Graphite.—Graphitwerk Kropfmühl AG was the only company that mined and processed natural graphite in Germany. The company operated a mine and plant at Kropfmühl, Passau, and a plant at Werk Wedel, Holstein. About one-half of the company's production, which has been falling in recent years because of declining reserves, went into the European refractory industry.

Gypsum.—Germany was a major European producer of crude gypsum. Gebr. Knauf Westdeutsche Gipswerke GmbH, which was the largest German producer of gypsum, accounted for more than two-thirds of the gypsum produced. The company operated mines in Baden-Württemberg, Bavaria, Hesse, Saarrland, and Lower Saxony. Rigips Baustoffwerke GmbH, which was the second largest producer, operated mines in Baden-Württemberg and Lower Saxony.

Potash.—After closings and restructuring, Kali und Salz AG (K+S) operated six mines in four potash districts and had a potassium chloride production capacity of 4 Mt/yr, of which the product grades were 2 Mt/yr standard-grade and 2 Mt/yr granular-grade. Germany was the third largest potash producer in the world after Canada and Russia. K+S had 13% of the world potash market and a 30% share of the market for potassium sulfate. K+S's Zielitz Mine was the company's largest operation and the linchpin of its potassium operations. The mine underwent a major investment program that resulted in a practically new potash operation (Kali und Salz Group, 2000).

Salt.—K+S and Solvay S.A. of Belgium were intending to join forces on the European salt market. The partners signed a Memorandum of Understanding aimed at creating a joint venture that would encompass their salt activities and whose output was intended for third parties. K+S would hold about 60% of the new company, and Solvay would own the remaining 40%, reflecting the value of the businesses that both partners bring to the joint venture. The joint venture would have a production of about 5 Mt/yr with facilities in Belgium, France, Germany, the Netherlands, Portugal, and Spain (K+S Aktiengesellschaft, October 20, 2000, Solvay and K+S intend to combine their salt businesses, accessed June 13, 2001, at URL http://www.k-plus-s.com/medien/pressemiteilungen/presse-001020_en.cfm).

Mineral Fuels

Germany relied principally on fossil fuels as sources of energy. In 2000, the most important energy source in Germany's consumption of primary energy was petroleum with a 40% share of total consumption, followed by natural gas with a 20% share; coal, 15%; lignite, 13%; nuclear, 10%; and hydroelectricity and wind power, 1% each. About 30% of Germany's energy requirement was satisfied from domestic sources; the remaining 70% of energy requirement was imported. By 2020, the share of imports was expected to rise to 80%, although oil was still expected to be the primary energy source. About 30% of electrical generation was supplied by nuclear plants (U.S. Energy Information Administration, November 2000, Germany, accessed August 1, 2001, at URL http://www.eia.doe.gov/emeu/cabs/germany.html).

In 1999, latest year for which data were available, the amount of electricity from alternate renewable energy sources, [5 billion kilowatthours (GkWh)], grew by 30%. The biggest renewable energy source was wind power, which contributed 2.9 GkWh (Alexander's Gas & Oil Connections, February 2, 1999, Renewable energy generation grew by 30% in Germany, accessed February 11, 1999, at URL http://www.gasandoil.com goc/news/nte90672.htm).

Anthracite and Bituminous Coal.—The gradual phaseout o subsidies that have for so long supported Western Europe's coa industry was continuing. This was in line with EU policy to eliminate subsidies to industries. There was to be a significant reduction in subsidies and the closure of 7 or 8 of Germany's 1 hard coal mines, resulting in an estimated decline from 76,000 miners in 1997 to 36,000 by 2005. However, the EC and Germany were in a dispute over Germany's subsidies to its coal industry, which the EC maintains are unacceptable under EU law. The EC was expected to launch legal proceedings against Germany unless it changed the terms under which it granted almost $2.9 billion of aid to its coal sector in 2000 (Coal Age, 2001).

Lignite.—Mining was mainly in the Rheinish area to the wes of Cologne and the Lusatian area near Dresden. Lignite mining was under less economic pressure than hard coal mining.

The lignite deposit in the Rhine region is the largest single formation in Europe and has considerable domestic importance With estimated recoverable reserves of 43 billion metric tons o lignite and a production of 168 Mt in 2000, Germany was the world's leading producer. Rheinbraun AG, which was

Germany's major lignite producer, mined more than 100 Mt/yr from four opencast mines—Bergheim, Garzweiler, Hambach, and Inden. Laubag AG, the second largest lignite producer, mined more than 60 Mt of coal with plans to increase production in the coming years. There were plans to merge Laubag and the electricity producer Veag AG, which buys 95% of Laubag's coal (Coal Age, 2000).

Infrastructure

Germany had a total of 625,600 kilometers (km) of highways and roads that ranged from the high-speed autobahn system to undeveloped gravel-and-packed-dirt country roads. Of this total, the autobahn consisted of 10,814 km; national highways, 43,786 km; State highways, 99,447 km; and municipal, county, and secondary roads, 471,553 km. The railroad system included 45,468 km of track, about 90% of which was Government owned. Of this total, 44,769 km was 1.435 meter (m) standard-gauge track, and 699 km was 1.000-m gauge track. Pipelines included a 3,644-km line for petroleum, a 3,964-km line for refined products, and a 97,564-km line for natural gas. Inland waterways and canals consisted of 7,541 km and 31 major ports; the Kiel Canal served as an important connection between the Baltic Sea and the North Sea, and the Rhine-Main-Danube Canal served as a connection between the North Sea and the Black Sea. The major maritime ports of Hamburg, Rostock, Bremerhaven, Bremen, and Wihelmshaven, in descending order, accounted for about 70% of total merchandise traffic.

Outlook

Germany's economy is expected to expand steadily for the next few years despite the huge burden of unification costs on the national economy. As growth in Germany's international trading partners increases, industrial production is expected to grow to meet the demands for consumer products. Restructuring industries, which included mineral-resource industries, to be more efficient was expected to result in increased unemployment, which in turn, would cut into the available resources of the Federal Government in the form of payments for unemployment compensation, retraining, and other social costs. This is expected to continue in the short term.

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14195 Berlin (Dahlem), Germany

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TABLE 1
GERMANY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/ 3/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Aluminum:						
Alumina, Al_2O_3 equivalent						
Calcined	thousand tons	755	738	600 r/ e/	583 r/	500
Hydrate	do.	792	800	700 e/	700 e/	600
Metal:						
Primary		576,422	571,944	612,381	633,804	643,545 4/
Secondary		416,915	432,467	453,328	482,658	572,257 4/
Arsenic, white, Ar_2O_3 content e/		250	250	200	200	200
Cadmium, metal, refinery including secondary		950	1,145 r/	1,020	1,145	1,020 4/
Cobalt, metal including alloys e/		800	600	500	500	500
Copper, metal:						
Smelter:						
Primary		296,800	273,100	258,600	266,400	275,000
Secondary e/		88,600	76,000	80,000 4/	60,000	75,000
Refined:						
Primary		315,600	297,800	322,800	271,000	335,000
Secondary		355,200	375,800	373,000	425,000	375,000
Iron and steel:						
Ore and concentrate:						
Gross weight		100,200	200,900	100,000 r/ e/	--	--
Fe content		14,600	28,100	14,000 r/ e/	--	--
Metal:						
Pig iron	thousand tons	27,722	30,939	30,162	27,932 r/	30,846 4/
Ferroalloys 5/	do.	95	96	100 e/	90 e/	80
Of which ferrochromium	do.	25	26	28 e/	17	18
Steel, crude	do.	39,791	45,009	44,046	42,056	46,376 4/
Semimanufactures	do.	32,889	37,074	36,591	35,879 r/	38,974 4/
Lead, metal:						
Smelter		140,000	161,300	100,000 e/	160,600 r/	170,000
Refined:						
Primary		88,700	164,800	176,800	169,557	210,515 4/
Secondary		149,400	164,400	203,400	204,000	204,000
Platinum-group metals, metal, refined e/	kilograms	60,000	60,000	60,000	60,000	50,000
Selenium, metal	do.	115	100	100	100	100
Silver, metal, refined e/	do.	600,000	500,000	500,000	500,000	500,000
Tin, metal, primary and secondary		14,836	15,708	1,000 r/ e/	1,000 e/	500
Uranium, concentrate, U_3O_8 content		46	27	25 e/	25 e/	28 4/
Zinc, metal including secondary		327,015	317,681	333,968	332,852	356,500 4/
INDUSTRIAL MINERALS						
Abrasives: e/						
Natural, pumice		210,000	212,000	300,000	250,000	200,000
Artificial, corundum		60,000	60,000	60,000	50,000	60,000
Barite, marketable (contained $BaSO_4$)		121,476	118,698	123,300	118,500	111,800 4/
Boron materials, processed borax, $Na_2B_4O_7$ $10H_2O$ content e/		1,500	1,200	1,200	1,000	1,000
Bromine e/		750	700	600	500	500
Cement:						
Clinker (intended for market) e/	thousand tons	1,100 4/	1,200	1,000	1,000	1,000
Hydraulic	do.	36,104	37,000 e/	36,610	38,099 r/	32,000
Chalk, crude including ground	do.	450	425	400	400 e/	400
Clays:						
Bentonite	do.	491	511	509	477 r/	465 4/
Ceramic clay e/	do.	3,500	3,500	5,000	3,543 r/ 4/	4,100 4/
Fire clay e/	do.	1,000 4/	1,000	1,000	1,000	1,000
Fuller's earth e/	do.	600 4/	500	600	500	500
Kaolin, marketable	do.	1,794	1,800 e/	3,400	3,543 r/	3,655 4/
Other, including brick clay	do.	21,600	22,000	20,000	20,000 e/	21,000
Diatomite	do.	--	--	54	53 r/	54 4/
Feldspar		359,666	455,969	460,000 e/	450,000 e/	450,000
Fluorspar:						
Acid-grade e/		31,000	22,500	25,000	26,800	29,600
Metallurgical-grade e/		1,448 4/	1,500	1,500	1,500	1,500
Total		32,448	24,000 e/	26,500 e/	28,300 4/	31,100 4/

See footnotes at end of table.

TABLE 1--Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/ 3/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 e/
INDUSTRIAL MINERALS--Continued					
Graphite, marketable	2,603	1,030	270	300	300
Gypsum and anhydrite, marketable e/ thousand tons	3,000	3,000	4,000 r/	4,600 r/	4,000
Lime, quicklime, dead-burned dolomite e/ do.	7,570	7,600	7,000	6,440 r/	6,850 4/
Magnesium salts (byproduct of potash mining) e/ do.	1,169 4/	1,200	1,200	1,200	1,200
Nitrogen, N content of ammonia do.	2,485	2,471	2,512	2,406	2,473 4/
Phosphate materials: e/					
Phosphatic fertilizers, P_2O_5 content	750 4/	800	700	700	700
Thomas slag:					
Gross weight thousand tons	150	150	150	150	200
P_2O_5 content	19,000	19,000	19,000	19,000	20,000
Pigments, mineral, natural	3,754	4,176	4,000 e/	4,000 e/	4,000
Potash, K_2O content thousand tons	3,332	3,423	3,582	3,543	3,407
Pumice, marketable e/ do.	600	600	600	500	500
Salt, marketable:					
Evaporated do.	731	700 e/	9,098	8,965	9,322 4/
Rock and other	15,176	15,087	5,056	6,921	4,904 4/
Sodium compounds, n.e.s.:					
Soda ash, manufactured e/ thousand tons	1,400	1,400	1,400	1,400	1,500
Sulfate, manufactured e/ do.	100	100	100	100	100
Stone, sand and gravel:					
Stone:					
Dimension, crude and partly worked e/	200,000	100,000	100,000	100,000	100,000
Dolomite and limestone, industrial thousand tons	64,000	68,000 e/	71,900	81,000 r/	77,900 4/
Quartz and quartzite	30,000	26,000 e/	25,000	25,000 e/	25,000
Slate	90,000	70,000 e/	70,000	70,000 e/	70,000
Sand and gravel:					
Building sand and gravel thousand tons	300,000	382,000	372,500	382,700	343,200 4/
Gravel including terrazzo splits e/ do.	225,000	200,000	200,000	200,000	200,000
Sand:					
Foundry do.	3,000	4,000 e/	3,500	3,500	3,500
Industrial (glass) do.	5,503	9,800 e/	10,000	10,000 e/	8,500
Sulfur, byproduct: e/					
Of metallurgy do.	30	25	25	25	30
Of natural gas and petroleum do.	1,001 4/	1,085 4/	1,100	1,135 4/	1,100
Other do.	90	50	50	60	100
Total do.	1,121	1,160	1,175	1,220	1,230
Talc and steatite	10,005	8,819	9,000 e/	9,000 e/	8,000
MINERAL FUELS AND RELATED MATERIALS					
Asphalt and bitumen, natural	9,821	11,285	10,000 e/	9,000 e/	10,000
Coal:					
Anthracite and bituminous, marketable thousand tons	47,913	46,792	40,960	43,849 r/	37,377 4/
Lignite do.	187,247	177,099	166,035	162,242	168,051 4/
Coke:					
Of anthracite and bituminous coal do.	10,662	10,744	10,277	8,568	9,115 4/
Of lignite do.	178	185	175 e/	175 e/	175
Fuel briquets:					
Of anthracite and bituminous coal do.	357	322	185	174	175
Of lignite (including dust and dried) do.	4,896	3,539	2,345	2,072	2,000
Gas:					
Manufactured:					
Blast furnace million cubic meters	4,239	4,655	4,500 e/	4,000 e/	4,000
Coke oven do.	2,406	2,539	2,500 e/	2,000 e/	2,000
Total do.	6,645	7,194	7,000 e/	6,000 e/	6,000
Natural:					
Gross do.	23,058	22,473	22,000 e/	23,000 e/	22,000
Marketed do.	21,360	20,780	19,900 e/	21,200	21,000
Peat:					
Agricultural use thousand cubic meters	2,800 r/	2,800 r/	9,561	9,473	9,648 4/
Fuel use	180,000	180,000	175,000	175,000 e/	175,000

See footnotes at end of table.

TABLE 1--Continued
GERMANY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/ 3/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
MINERAL FUELS AND RELATED MATERIALS--Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	20,756	20,361	21,146	19,728	22,658 4/
Refinery products:						
Liquefied petroleum gas	do.	32,352	29,208	29,255	31,888	32,688 4/
Gasoline including aviation	do.	226,058	219,311	223,465	228,038 r/	229,101 4/
Naphtha	do.	79,058	73,925	81,379	82,648	82,085 4/
Mineral jelly and wax	do.	3,600 e/	3,600 e/	1,527	1,472 r/	1,770 4/
Kerosene and jet fuel	do.	25,691	28,094	211,676	33,046 r/	33,534 4/
Distillate fuel oil	do.	353,052	338,744	265,555	343,167 r/	345,637 4/
Refinery gas	do.	3,437	2,821	3,227	2,706	3,269 4/
Lubricants	do.	4,800 e/	4,800 e/	10,787	11,298	10,556 4/
Nonlubricating oils	do.	7,000 e/	7,000 e/	7,867 r/	8,197	8,100 4/
Residual fuel oil	do.	77,769	70,216	14,626	67,399 r/	75,756 4/
Bitumen and other residues e/	do.	25,000 e/	26,000 e/	16,968	22,228 r/	22,587 4/
Bituminous mixtures	do.	1,200 e/	1,200 e/	1,211 r/	1,199	1,100 4/
Petroleum coke	do.	5,813	7,399	7,539	10,428	5,819 4/
Unspecified	do.	18,000	16,000	18,242	16,254	11,977 4/
Total	do.	863,000 e/	828,000 e/	893,324 r/	859,968 r/	863,979 4/

e/ Estimated. r/ Revised. -- Zero.

1/ Table contains data available through August 2001.

2/ Data are from a combined Germany.

3/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

4/ Reported figure.

5/ Includes speigeleisen, unspecified crude iron, and blast furnace ferromanganese with 2% or more carbon.

TABLE 2
GERMANY: SELECTED INDICES OF PRODUCTION

(1990=100)

Sector	1996	1997	1998	1999	2000 e/
General	101	104	109	110	115
Mining	94	91	85	84	79
Manufacturing	100	104	110	111	117
Electricity and gas	106	105	105	106	103
Construction	93	90	87	88	83

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no. 12, December, p. 12.

TABLE 3
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	VAW Aluminium AG	Plant at Schwandorf (special aluminas)	430
Do.	Aluminium Oxid Stade GmbH (VAW, 50%, Alcoa Inc., 50%)	Plant at Stade	750
Do.	Martinswerke GmbH (Alusuisse, 100%)	Plant at Bergheim (fused alumina)	350
Aluminum	VAW Aluminium AG	Smelters: Innwerke at Töging, Elbewerke at Stade, Rheinwerke at Neuss, Lippenwerke at Lünen (secondary)	300
Do.	Aluminium Essen GmbH	Smelter at Essen-Borbeck	95
Do.	Hamburger Aluminium-Werke GmbH (VAW, 33%)	Smelter at Hamburg	120

See footnotes at end of table.

TABLE 3--Continued
GERMANY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Arsenic, metal tons	Metaleurop Handel GmbH	Plant at Langelsheim	5
Cement	38 companies, the major ones are:	64 mills (grinding) including:	59,000
Do.	Heidelberger Zement AG	Plants at Blaubeuren-Schelklingen, Leimen, Hassmersheim, Burglengenfeld, Kieferssfelden, and others	-9,200
Do.	Dyckerhoff AG	Plants at Amoneburg, Golheim, Neuwied, Neubeckum, and others	-7,250
Do.	E. Schwenk, Zementwerke KG	Plants at Allmendingen, Karlstadt, and Margelstetten	-6,000
Do.	Anneliese Zementwerke AG	Plants at Ennigerloh-Nord, Ennigerloh-Sud, Geske, and Paderborn	-3,500
Do.	Zementwerke Deunan GmbH	Plant at Deuna	-3,000
Chalk	Kreidewerke Rugen GmbH	Quarries on Rugen Island	500
Coal, anthracite and bituminous	Four companies:	About 27 mines, including:	72,500
Do.	Ruhrkohle AG	14 mines in the Ruhr region	-40,000
Do.	Saarbergwerke AG	5 mines in the Saar Basin	-14,000
Do.	Preussag Anthrazit GmbH	Mine at Ibbenbüren	-2,500
Copper	Norddeutsche Affinerie AG (Dresdner Bank AG, 20%; Degussa AG, 10%)	Smelter at Hamburg	290
Do.	do.	Refinery at Hamburg	350
Do.	Hüttenwerke Kayser AG	Refinery at Lünen	120
Kaolin	Kemmlitzer Kaolinwerke GmbH	Mines at Gröppendorf, Oschatz, and Sachsen	100
Do.	do.	Plant at Sachen	100
Limestone	Harz Kalk GmbH	Quarries at Bad Kösen, Rubelaand, and Kaltes Tal	6,000
Lead	Metaleurop Weser Blei GmbH	Smelter and refinery at Nordenham	120
Do.	Berzelius Metallhütten GmbH	QSL smelter at Stolberg	75
Do.	do.	Refinery at Duisberg	120
Do.	Norddeutsche Affinerie AG	Refinery at Hamburg	50
ignite	Rheinische Braunkohlenwerke AG (Rheinbraun)	Surface mines in Rhenish mining area: Garzweiler, Bergheim, Inden, and Hambach	105,000
Do.	Lausitzer Braunkohle AG (LAUBAG)	Surface mines in Lausatian mining area: Jänschwalde/ Cottbus-Nord, Welzow-Süd, and Nochten/ Reichswalde	50,000
atural gas million cubic meters	Brigitta Erdgas und Erdöl GmbH and Elwerath Erdgas-Erdöl GmbH	Plants at Clenze and Grossenkmeten	9,500
Do. do.	Mobil Erdgas-Erdöl GmbH	Plants at Scholen	4,000
Do. do.	Other companies	Plants at Duste, Rutenbrock, and others	2,000
etroleum:			
Crude thousand 42-gallon barrels	The largest companies are:	6 areas with about 85 oilfields, including:	80,000
Do. do.	Elwerath Erdgas-Erdöl GmbH	West of Ems River	-30,000
Do. do.	Wintershall AG	Weser-Ems Rivers	-21,000
Do. do.	Deutsche Texaco AG	Elbe-Weser Rivers	-20,000
Refined do.	About 25 companies, of which the largest:	20 refineries, including:	2,062,000
Do. do.	Deutsche Shell AG	Refineries at Godorf, Hamburg, and Grasbrook	-256,000
Do. do.	Esso AG	Refineries at Karlsruhe and Ingolstadt	-245,000
Do. do.	Ruhr Oel AG	Refinery at Gelsenkirchen	-215,500
Do. do.	Erdoel Raffinerie Neustadt GmbH	Refinery at Neustadt-Donau	-145,000
otash, K_2O content	Kali und Salz AG	Mines at Bergmannssegen-Hugo, Niedersachen-Riedel, Salzdetfurth, Sigmundshall, Hattorf, Neuhof-Ellers, and Wintershall	3,500
Do.	MDK (Mitteldeutsche Kali und Sondershausen)	10 mines mostly in the State of Thüringen	2,500
alt (rock)	Kali und Salz AG	Mines at Bad Friedrichshall-Kochendorf, Braunschweig-Luneburg, Heilbronn, Riedel, Stetten, and Wesel (Borth)	15,000
eel	Major companies including:	About 25 plants, including:	45,000
Do.	Thyssen Krupp Stahl AG	Plants at Krefeld, Duisburg, Hattungen, Oberhausen, and Written	-13,000
Do.	Fried. Krupp AG Hoesch-Krupp	Plants at Bochum, Dortmund, and Rheinhausen	-9,000
Do.	Stahlwerke Peine-Salzgitter AG	Plants at Peine and Salzgitter	-4,500
Do.	Klöckner-Werke AG	Plants at Bremen and Osnabruck	-4,200
inc	Ruhr-Zink GmbH (Metallgesellschaft AG, 100%)	Refinery at Datteln	200
Do.	Berzelius Metallhütten GmbH	Imperial smelter and fire refinery at Duisburg	100
Do.	Metaleurop Weser Zink GmbH	Refinery at Nordenham	130

THE MINERAL INDUSTRY OF

GREECE

By Harold R. Newman

The mineral industry, comprising the mining, industrial minerals, and metal processing sectors, was a small but important part of the national economy and was highly concentrated. About 60% of the industry's production was handled by five mining companies. Bauxite was the most important Greek mineral commodity. Other important commodities were chromite, gold, iron, lead, nickel, and zinc. Aluminum was produced from domestic sources of bauxite and alumina and was important in the domestically integrated metals sector. The steel produced was mostly from imported scrap (table 1). Greece was the largest producer of bauxite, magnesium, nickel, and perlite in the European Union (EU).

The industrial minerals sector was more important in the national economy than the metal sector and accounted for 14% of gross domestic product (GDP). The mining sector accounted for about 1% of the GDP. Production of mineral commodities in Greece was closely tied to the export market. Exports of such minerals as bauxite, bentonite, nickel, and perlite made up a major share of total revenues. About 50% of the country's minerals were being exported. There was a minerals surplus trade balance as more minerals were exported than imported. In 2000, the more important commodities were bentonite, magnesite, and perlite. Privatization efforts were continuing in the magnesite and refractories industries (U.S. Department of State, July 2000, Greece—FY 2000 country commercial guide, accessed March 13, 2001, at URL http://www.state.gov/www/about_state/business/com_guides/2000/europe/greece_CCG2000.pdf). During the long term, the significance of the minerals industry was slowly lessening.

Because northern Greece was thought to contain a significant amount of exploitable mineral resources, it received more attention in exploration activities. In 2000, most activities were directed towards gold. Only a few foreign companies had invested in Greek mines. These companies included TVX Hellas S.A. (an affiliate of TVX Gold Inc. of Canada), which bought the Kassandra Mines (the Olympias and the Stratoni deposits); United Kingdom-based Microfine S.A., which operated mines that extracted a rare material called hundite, unique for its flame-retardant properties; and the German-based Otavi Minen Hellas S.A., which operated perlite mines. Selected Greek companies with major equity owners are listed in table 2.

Environmental concerns were the responsibility of the Ministry of Environment, Town Planning, and Public Works. The Government took an active role in environmental protection. The general laws enacted by the Government included Law 1360/76 (Siting Arrangement and Environment), Presidential Executive Order 1180/81, and Law 1650/86 (Environmental Protection), which together formed the basis of the active legislative framework. To comply with EU Order 88/609 concerning emission limitations, the Government executed Ministry Decision 58751/2370/15.4.93, which included the limits of the main pollutants from electric powerplants.

Aluminium de Grèce S.A. (a subsidiary of Pechiney of France), which was the only producer of primary aluminum in Greece, completed parts of a $64.3 million investment plan that began in 1996. The program will allow for the decrease of production costs by 20% and will result in increased productivity. The company produces and processes aluminum and profiles, alumina, and bauxite and manufactures related items (Aluminium de Grèce S.A., March 21, 2000, Company summary, accessed February 14, 2001, at URL http://profiles.wisi.com/profiles/scripts/corpinfo.asp?CUSIP=C30021900.htm).

Bauxite mining and processing continued into 2000. Silver & Baryte Ores Mining Co. S.A.'s (S&B) operations, which were formerly owned by Bauxites Parnasse Mining Co. S.A., continued in the Itea area, with most of the production exported. S&B's bauxite deposits are of karst-Mediterranean type and consist of three bauxite horizons. The upper diaspore horizon and the middle boehmite horizon were mined by both open pit and underground methods. Run-of-mine bauxite was transported 30 kilometers (km) to the plant where it was crushed, screened, sorted, and blended to meet the specific needs of customers. Delphi-Distomon S.A. continued to produce bauxite, which was sold to Aluminium de Grèce S.A.'s operation at Distomon (Industrial Minerals, 2001b).

Eleusis Bauxite Mines S.A. (Elbaumin) had produced bauxite from two mines in Lamia. Elbaumin's assets, however, were sold to private interests; it was unclear whether they would continue with bauxite production (Industrial Minerals, 2001a).

The Kassandra Mines have produced lead, silver, and zinc for more than 30 years. The mines were bought in 1996 by TVX Hellas to exploit the refractory gold ores by incorporating pressure oxidation technology into the ore-processing phase.

TVX reported that its environmental impact study had been approved for the Olympias project. The project planned to produce 7600 kilograms per year (kg/yr) of gold in doré , 69,000 kg/yr of silver, 22,500 metric tons per year (t/yr) of lead, and 21,500 t/yr of zinc (Mining Journal, 2000d). Estimated proven and probable resources were 127.2 metric tons. The mine, costing an estimated $248 million, was expected to begin production in 2003 and have an 18-year life (Mining Engineering, 2000). The Greek Ministry of Environment, Town Planning, and Public Works turned down the environmental impact statement (EIS) of Midas SA, which held a gold exploration licence on the island of Milos. The rejection effectively precludes further exploration. The company has requested a review and a full explanation noting that an identical EIS that covered the same area on Milos and submitted by Midas in July 1999 was approved by the same department of the Ministry. Resources at the Milos project were estimated to be 8.6 million metric tons (Mt) at a grade of 2.4 grams per metric ton (g/t) of gold (Mining Journal, 2000a).

Normandy Mining Ltd. of Australia announced that, as part of refocusing on gold, it had acquired a further 13.33% interest in the Perama gold project from S&B. In 2000, Normandy owned 80% of the project, and S&B retained 20%. The project had an estimated 11 Mt at a grade of 3.8 g/t of gold. Initial production was scheduled for early 2002 (Mining Journal, 2000c).

In 2000, General Mining & Metallurgical Co. S.A. (Larco) restarted some of its idle nickel production capacity. The plant ran at about two-thirds capacity in 1999 owing to the low price of nickel. Larco was considering raising output to its normal production capacity of about 18,000 t/yr (Mining Journal, 2000b).

As part of a $75 million modernization that began in 1998, Sidenor S.A. was close to full production at its plant in Thessaloniki. The goal was to have the plant producing around 530,000 t/yr by 2001. Narrow strip production was underway, and other parts of the project were continuing. Upgrades were being made to a 600,000 t/yr melting shop that was scheduled to be commissioned by mid-2001 (Metal Bulletin, 2000).

In the industrial minerals sector, Hellenic Mineral Mining Co. S.A. continued asbestos mining operations at the mines at Zidani near Kozani. Most of the various grades of asbestos fibers produced were exported. The fibers are suitable for mixed applications, such as asbestos-cement pipes and roofing applications.

Greece was the second largest world producer of bentonite after the United States. Bentonite is extracted from Milos by open pit mining. Mykobar Mining Co. S.A. and S&B are the major producers and accounted for almost all Greek bentonite production. Mykobar's operation has the capacity to produce more than 200,000 t/yr, while S&B operates a 600,000-t/yr-capacity facility. Major applications were iron ore pelletizing, drilling mud, civil engineering applications, foundry applications, and cat litter.

The Greek Competition Committee approved the acquisition of a controlling interest in Heracles General Cement Co. S.A. (54.48%) and Halkis Cement S.A. (72.65%) by Blue Circle Industries plc of the United Kingdom. Heracles is the largest cement company in Greece, with two modern plants and a market share of 40%; Halkis Cement has one plant and a market share of 12.5%. This $575 million deal made Blue Circle the premier cement producer in Greece and a strong player in the southeastern Mediterranean region (Blue Circle Industries plc, April 25, 2000, Greek Competition Committee approves Blue Circle's acquisition of controlling interest in Heracles and Halkis Cement, accessed December 20, 2000, at URL http://www.bluecircle.co.uk/html/corp/2000_013.html).

Lava Mining & Quarrying Co. S.A. specialized in industrial minerals with production of gypsum from the island of Crete, pozzolan from the island of Milos, and pumice from the island of Yali.

Grecian Magnesite S.A. was a leading magnesite producer in the Western World, with its open pit mine at Yerakini in northern Greece. After being mined, the material was processed, beneficiated, and fed into rotary or shaft kilns for conversion to caustic or dead-burned magnesia.

In 2000, the Greek marble industry continued to play a leading role in the international dimension stone market as a result of the existence of marble production in almost all areas of the country, the variety of uses, and the range of colors (ash, black, brown, green, pink, red, and multicolored). The marble industry was active in the quarrying, processing, and selling blocks and finished products.

S&B continued production of natural zeolite in northern Greece. The operation produces five grain sizes of clinoptilolite, which has a high cation-exchange capacity owing to its honeycomb crystalline structure.

The Public Power Corporation (PPC) was the major producer of lignite, which was the predominant fuel in electricity generation in Greece. Most PPC lignite is produced from the Ptolemais-Amyntaion Basin with lesser amounts from the Megalopolis Basin. Lignite reserves were estimated to be 2,900 Mt (U.S. Energy Information Administration, August 2000, Greece—Country analysis brief, accessed November 8, 2000, at URL http://www.eia.doe.gov/emeu/cabs/greece.htm).

Hellenic Petroleum SA, which was the state-controlled energy corporation, started construction of a 230-kilometer pipeline to a refinery it has acquired in Skopje, Macedonia. The $100 million pipeline, due to be completed by mid-2001, was the first big infrastructure project to get underway in the Balkans since the end of the Kosovo conflict. The pipeline would have the capacity to carry 2.5 million metric tons per year of crude oil from a storage depot in Thessaloniki to the Okta refinery outside Skopje (FT.com, July 31, 2000, Greece starts 230 km pipeline, accessed August 1, 2000, via URL http://news.ft.com).

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Major Source of Information

Institute of Geology and Mineral Exploration
70 Messoghion St.
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Ministry of Development
Directorate of Raw Materials Mineral Policy, Section A
80 Michalakopoulou St.
10192 Athens, Greece

TABLE 1
GREECE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/	1996	1997	1998	1999	2000 e/
METALS					
Aluminum:					
Bauxite	2,451,734	1,876,600	1,823,000	1,882,505 r/	1,990,500 4/
Alumina, Al_2O_3	601,580	615,700	625,000 e/	625,590 r/	667,141 4/
Metal:					
Primary	141,295	132,600	145,900	170,301 r/	167,507 4/
Secondary e/	3,000	3,000	3,000	3,000	3,000
Chromite, run-of-mine e/	11,725 4/	12,000	12,000	12,000	12,000
Iron and steel:					
Iron ore and concentrate, nickeliferous:					
Fe content e/	810,000 r/	700,000	700,000	600,000	575,000
Ni content	21,600 r/	18,419 r/	16,985 r/	16,050 r/	19,535 4/
Metal:					
Steel, crude	950,000 e/	1,016,000	1,109,000	951,000 r/	1,088,000 4/
Ferroalloys, ferronickel, gross weight	71,204 4/	70,440 r/	60,020 r/	59,545 r/	81,662 4/
Ni content	17,825 r/	17,600 r/	15,005 r/	12,964 r/	17,470 4/
Lead, mine output, Pb content e/	11,541 4/	19,300	18,000	22,001 r/	18,235 4/
Manganese:					
Ore, crude: e/					
Gross weight	11,000	12,067 4/	10,000	990 r/	10,000
Mn content	2,572 4/	2,600	2,500	353 r/	350
Concentrate:					
Gross weight e/	3,000	2,910	2,910 e/	345 r/	350
Mn content	1,443 4/	1,440 r/	1,440 r/	149 r/	150
Nickel, metal, Ni content of ferronickel	17,801	17,610	15,005	13,462 r/	17,125 4/
Silver, mine output, Ag content kilograms	16,600 4/	45,000 e/	45,000	45,771 r/	37,145 4/
Tin, metal, secondary e/	100 r/	150	200	-- r/	-- 4/
Zinc, mine output, Zn content by analysis	13,602	17,800 e/	29,100	19,619 r/	20,336 4/
INDUSTRIAL MINERALS					
Asbestos: e/					
Ore	4,862,799 4/	4,038,076 4/	4,000,000	-- r/	-- 4/
Processed, fibers	80,213 4/	63,294 4/	70,000 r/	-- r/	-- 4/
Barite:					
Ore, crude	671	905	800 e/	500 e/	500
Concentrate	530	742	600 e/	367 r/	300
Cement, hydraulic e/ thousand tons	14,700 r/	14,982 4/	15,000	14,000	14,500
Clays:					
Bentonite:					
Crude	973,517	942,555	950,000 e/	1,049,657 r/	1,150,000
Processed	764,578	572,718	750,000 e/	186,716 r/	200,000
Kaolin: e/					
Crude	60,453 4/	60,000 4/	60,000	64,931 4/	65,000
Processed	300	300	300	300	300
Feldspar e/	60,000	65,000	65,000	78,500 4/	95,000
Gypsum and anhydrite	546,344	662,640	600,000 e/	686,416 r/	750,000
Magnesite:					
Crude	682,346	623,050	650,000 e/	495,144 r/	500,000
Dead-burned	57,438	86,260	70,000 e/	39,965 r/	45,000
Caustic-calcined	120,072	116,775	125,000 e/	117,817 r/	120,000
Huntite, crude e/	13,000	19,422 4/	18,000	18,000	18,000
Nitrogen, N content of ammonia	90,400	82,700 e/	177,600 r/	119,697 r/	121,200 4/
Perlite:					
Crude	598,640	695,917	600,000	777,898 r/	600,000
Screened	417,882	500,714	500,000	435,431 r/	360,000
Pozzolan (Santorin earth)	745,790	766,750	750,000	934,933 r/	950,000
Pumice	867,450	841,646	850,000	885,000 r/	860,000
Salt, all types e/	147,239 4/	150,000	150,000	176,867 4/	180,000
Silica	86,600	95,730	90,000	126,000 r/	125,000

See footnotes at end of table.

TABLE 1--Continued
GREECE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/	1996	1997	1998	1999	2000 e/
INDUSTRIAL MINERALS--Continued					
Sodium compounds: e/					
Carbonate	750	750	750	750	750
Sulfate	6,000	6,000	5,000	5,000	5,000
Stone:					
Dolomite	23,000	90,000 e/	90,000	90,000	90,000
Marble cubic meters	196,669	200,000 e/	200,000	178,199 r/	200,000
Flysch	85,138	90,000 e/	80,000	80,000	80,000
Quartz, processed	6,350	7,500 e/	6,500	6,500	6,500
Sulfur: e/					
S content of pyrites	9,660 4/	10,000	9,500	9,500	9,600
Byproduct of natural gas	105,000	52,000	55,000	55,000	60,000
Byproduct of petroleum	10,000	7,600	7,500	7,500	8,000
Total	125,000	69,600	72,500	72,000	77,600
Zeolite e/	2,000	3,000	4,000	3,000	3,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Lignite thousand tons	59,738	56,375 r/	60,400	61,861 r/	65,000
Lignite briquets e/	50,000	50,000	50,000	34,000 r/	34,000
Coke, gashouse e/	15,000	15,000	14,000	-- r/	--
Gas:					
Manufactured, gasworks e/ million cubic meters	15	15	15	15	15
Natural do.	38	43	40 e/	21 r/	36
Natural gas plant liquids e/ thousand 42-gallon barrels	350	350	350	350	350
Petroleum: e/					
Crude do.	3,738 4/	3,380 4/	3,400	3,400	1,792 4/
Refinery products:					
Liquefied petroleum gas do.	5,000	5,000	5,000	6,415 r/	8,886 4/
Gasoline do.	30,000	30,000	30,000	27,243 r/	31,943 4/
Naphtha do.	4,500	4,500	4,500	7,480 r/	8,806 4/
Mineral jelly and wax do.	15	15	15	14 r/	28 4/
Jet fuel do.	12,000	12,000	12,000	15,152 r/	16,696 4/
Kerosene do.	150	150	150	62 r/	70 4/
Distillate fuel oil do.	26,000	26,000	26,000	36,300 r/	42,127 4/
Refinery gas do.	2,000	2,000	2,000	2,891 r/	3,416 4/
Lubricants do.	1,000	1,000	1,000	1,239 r/	1,120 4/
Residual fuel oil do.	36,000	36,000	36,000	41,532 r/	50,017 4/
Bitumen do.	1,500	1,500	1,500	2,491 r/	3,133 4/
Petroleum coke do.	500	500	500	721 r/	897 4/
Other do.	400	400	400	154 r/	462 4/
Refinery fuel and losses do.	5,500	5,500	5,500	5,922 r/	7,126 4/
Total do.	125,000	125,000	125,000	147,621 r/	174,727 4/

e/ Estimated. r/ Revised. -- Zero.

1/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes data available through July 2001.

3/ In addition to the commodities listed, other crude construction materials are produced, but no basis exists to estimate production.

4/ Reported figure.

TABLE 2
GREECE: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina		Aluminium de Grèce S.A. (Pechiney of France, 60%)	Distomon, in Boeotia	640
Aluminum		do.	do.	150
Asbestos		Hellenic Mineral Mining Co. S.A.	Mines at Zidani, near Kozani	100
Barite, $BaSO_4$		Silver & Baryte Ores Mining Co. S.A. (Eliopoulos-Kyriacopoulos Group)	Milos Island	1
Bauxite		do.	Mines at Fokis, plants at Fokis and Itea	2,000
Do.		Eleusis Bauxites Mines, S.A. (ELBAUMIN)	Mines near Drama, Itea, and Fthiotis-Fokis	300
Do.		do.	Plants in Aghia Marina, Drama, and Itea	400
Do.		Delphi-Distomon S.A.; Hellenic Bauxites of Distomon S.A. (Aluminium de Grèce S.A.)	Open cast mines at Delphi-Distomon area	500
Bentonite:				
Crude		Mediterranean Bentonite Co. S.A. (Industria Chemica Mineraria S.p.A., Italy)	Surface mines on Milos Island	20
Do.		Mykobar Mining Co. S.A. (Silver & Baryte Ores Mining Co. S.A.)	Mines at Adamas, Milos Island	180
Do.		do.	Plants at Adamas, Milos Island	150
Do.		Silver & Baryte Ores Mining Co. S.A. (Eliopoulos-Kyriacopoulos Group)	Mines at Adamas, Milos Island	500
Processed		do.	Plant at Voudia Bay, Milos Island	400
Cement		Halkis Cement Co. S.A. (Blue Circle Industries Plc., 72.65%)	Micro-Vathi plant, west-central Euboea Island	3,000
Do.		Halyps Cement S.A. (Ciments Français, France)	Paralia Aspropyrgos plant, Athens	800
Do.		Heracles General Cement Co. S.A. (Blue Circle Industries Plc., 54.48%)	Plant at Milaki	1,900
Do.		do.	Plant at Volos	4,600
Do.		Titan Cement Co. S.A.	Elefsis plant, Athens	400
Do.		do.	Kamari plant, Boeotia	2,600
Do.		do.	Patras plant, northern Peloponnesus	1,900
Do.		do.	Thessaloniki plant, Thessaloniki	1,650
Chromite		Financial-Mining-Industrial and Shipping Corp. (FIMISCO) (IRO)	Tsingeli Mines and plant near Volos	25
Ferroalloys, Ni content of ferronickel		General Mining & Metallurgical Co. S.A. (Larco) (IRO)	Larymna metallurgical plant	25
Gold, Au in concentrate		TVX Hellas (TVX Gold Inc., Canada)	Kassandra Mines, Olympias	25
Gypsum		Lava Mining & Quarrying Co. S.A.	Altsi deposit, Crete Island	250
Do.		Titan Cement Co. S.A.	do.	280
Lead, mine, Pb in concentrate		TVX Hellas (TVX Gold Inc., Canada)	Kassandra Mines (Olympias, Stratoni) northeastern Chalkidiki	
Lignite		Public Power Corporation (Government)	Aliveri Mine, Euboea Island	420
Do.		do.	Megalopolis Mine, central Peloponnesus	7,000
Do.		do.	Ptolemais Mine, near Kozani	28,000
Manganese, battery-grade MnO_2		Eleusis Bauxite Mines Mining, Industrial and Shipping S.A. (National Bank of Greece)	Nevrokopi, Drama	10
Magnesite, concentrate		Viomagn-Fimisco Ltd. (Violignit S.A., 65%; Alpha Ventures, 35%)	Mines at Gerorema, Kakavos, and Mantoudhi, northern Euboea Island	250
Do.		Grecian Magnesite S.A.	Mine and plant at Yerakini, Chalkidiki	200
Natural gas	million cubic meters per day	Public Petroleum Corporation (Government)	Prinos offshore gasfield and oilfield, east of Thasos Island	125
Nickel, ore		General Mining & Metallurgical Co. S.A. (Larco) (IRO)	Agios Ioannis Mines near Larymna	500
Do.		do.	Mines on Euboea Island	2,500
Perlite		Silver & Baryte Ores Mining Co. S.A. (Elipoulos-Kyriacopoulos Group)	Mines on Kos and Milos Islands; plant at Pireaus	300
Do.		Otavi Minen Hellas S.A. (Otavi Minen AG, Germany)	Milos Island	150
Do.		Bouras Co.	Kos Island	50
Petroleum, refined	42-gallon barrels per day	Hellenic Aspropyrgos Refinery S.A.	Aspropyrgos	95,000
Do.	do.	Motor Oil (Hellas) Corinth Refineries S.A..	Aghii Theodori, Corinth	140,000
Do.	do.	Petrola Hellas S.A.	Eleusis	100,000
Do.	do.	Thessaloniki Refining Co. A.E.	Thessaloniki	76,000
Pozzolan (Santorin earth)		Lava Mining & Quarrying Co. (Heracles General Cement Co. S.A.)	Quarries on Milos Island	350
Do.		Titan Cement Co. S.A.	do.	300

TABLE 2--Continued
GREECE: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, crude	Halyvourgia Thessalias S.A. (Manessis Bros. and Voyatzis S.A., 65%; National Investment Bank for Industrial Development, 35%)	Steelworks at Volos	1,500
Do.	Halyvourgiki, Inc.	Steelworks at Eleusis	1,200
Do.	Sidenor S.A. (also known as Halivourgia Voriou Ellados S.A.)	Steelworks at Volos	600
Do.	do.	Steelworks in Magnesia	350
Zeolite	Silver & Baryte Mining Co. S.A. (Eliopoulos-Kyriacopoulos Group)	Mine at Pendalofos; plant at Ritsona	100
Zinc, mine, Zn in concentrate	TVX Hellas S.A. (TVX Gold Inc., Canada)	Kassandra Mines (Olympias, Stratoni), northeastern Chalkidiki	25

THE MINERAL INDUSTRY OF

ICELAND

By Chin S. Kuo

The country's economic growth in terms of gross domestic product slowed to 3.5% in 2000 from that of 4.5% in 1999. Iceland has abundant natural resources of geothermal and hydroelectric energy but is poor in mineral resources. Diatomite was one of the industrial minerals being mined and exported. Aluminum smelting and ferrosilicon production from imported materials were other activities of the mineral industry, and their outputs also were exported. The nation imported petroleum products. Most of the trade was with the European Union countries.

Owing to increased rainfall, Landsvirkjun, the Government-owned utility, ended the partial cut of power supply to the Nordural aluminum smelter, which had been in force since September 1999. The smelter restored idled electrolytic cells with the aim to bring production capacity back to 60,000 metric tons per year (t/yr) in May, which due to lining wear and idling of electrolytic cells had resulted in capacity loss of 5% to 6%. Expansion by 30,000 t/yr at Nordural's smelter was expected subject to completion of an estimated $80 million to $90 million financing. A power contract had been signed with Landsvirkjun for the expansion (Metal Bulletin, 2000).

Haefi of Iceland and Norsk Hydro A/S of Norway formalized plans for a joint venture to build a $1.425 billion aluminum plant at Reyoarfjorour in eastern Iceland. A feasibility study remained to be completed and production was scheduled for 2006. Norsk Hydro would contribute 40% of the cost, and Haefi, the rest. The plant would initially produce 240,000 t/yr of aluminum and increase output to 360,000 t/yr. Norsk Hydro had further plans to expand the production capacity of the plant to 480,000 t/yr if it could get the necessary power and permits (Financial Times, 2000).

Iceland's indigenous diatomite was produced from diatomaceous earth by Diatomite Plant Ltd. near Lake Myvatn. Production capacity was at a level of 26,000 t/yr. A magnesium project at Sudurnes was under consideration by Icelandic Magnesium Ltd. The proposed plant with a production capacity of 50,000 t/yr was to extract magnesium from seawater (Mining Magazine, 2000).

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TABLE 1
ICELAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000
Aluminum metal, primary 2/	103,800 3/	122,900 3/	173,400 3/	219,509 r/ 3/	224,439 3/
Cement, hydraulic 4/	88,200 3/	101,000 r/	117,684 r/ 3/	131,292 r/ 3/	143,734 3/
Diatomite	25,600 3/	26,000	26,000	28,299 r/ 3/	27,614 3/
Ferrosilicon	70,520 r/ 3/	70,000 r/	68,000 r/	70,933 r/ 3/	70,000
Nitrogen, N content of ammonia	7,400 r/	7,400 r/	5,900 r/	6,500 r/	6,500
Pumice and related volcanic material:					
Pumice	25,000	25,000	25,000	25,000	25,000
Scoria	500	500	500	500	500
Salt	4,000	4,000	4,000	4,000	4,000
Sand:					
Basaltic cubic meters	1,200	1,200	1,000	1,000	1,000
Calcareous, shell do.	82,000	82,000	80,000	80,000	80,000
Sand and gravel thousand cubic meters	3,600	3,600	3,600	3,600	4,000
Silica dust 5/	14,000	14,000	12,000	11,628 r/ 3/	12,000
Stone, crushed:					
Basaltic	90,000	90,000	90,000	90,000	95,000
Rhyolite cubic meters	16,500	16,500	16,500	16,500	17,000

r/ Revised.

1/ Table includes data available through May 23, 2001.

2/ Ingot and rolling billet production.

3/ Reported figure.

4/ Sales.

5/ Byproduct of ferrosilicon.

THE MINERAL INDUSTRY OF

IRELAND

By Harold R. Newman

Ireland remained a major European Union (EU) producer of zinc and an important producer of alumina, lead, and peat in 2000. Although the range of minerals exploited in the country has been limited, exploration activity for new mineral resources continued to increase, mainly emphasizing gold, lead, and zinc. The country's mineral processing industry was small, as was the demand for and consumption of mineral products (table 1).

Interest in gold, lead, and zinc exploration has provided the impetus for the revitalization of the exploration sector within the past few years. The upswing in activity in the lead and zinc sector has resulted in the development of new mines and the investigation of several other potential projects (table 2).

After 5 consecutive years of rapid economic growth without serious inflationary pressure, the Irish economy, referred to as "Celtic tiger," was the fastest growing economy in the EU and the Organization for Economic Cooperation and Development. As of January 1, 2000, Ireland became a full member of the Euro-zone and was expected to initiate use of the euro (€) as the country's currency in 2002 (U.S. Embassy, Dublin, Ireland, 2000, p. 4-5).

Conroy Diamonds and Gold plc was proceeding with exploration on its Clontibret project. Conroy believed it had identified a new gold belt straddling the borders of Counties Cavan, Monaghan, and Armagh (Northern Ireland). The most advanced target on the belt was Tullybuck and Lisglassan near Clontibret, where Conroy has drilled six holes and intersected gold values over minable widths. The work followed an evaluation of an earlier exploration that included results from 32 holes. Historically, the deposit had been exploited for its antimony ore, where two small underground mining operations had been established at Tullybuck and Lisglassan (Mining Journal, 2000a).

Ireland was a major zinc producer, with concentrate exports accounting for 214,000 metric tons (t) of zinc or 42% of European zinc exports in 1999, which is the latest year for which data are available. Exports are expected to increase when the Lisheen Mine reaches full production. Production was centered on Anglo American plc's and Ivernia West plc's joint venture Lisheen zinc-lead mine, Arcon International Resources plc's Galmoy zinc-lead mine, and Outokumpu Oyj's Tara zinc-lead mine. These were three of Europe's most modern mines (Potts, 2000).

The Galmoy Mine was in full production and mined about 2,600 metric tons per day (t/d) of ore grading more than 11% zinc. Most of the current reserves were contained in three major ore bodies, of which the 4-million-metric-ton (Mt) CW ore body was being worked. Development work was started to access the G ore body, with the K zone to follow. The ore body was mined underground using the room-and-pillar method. All the ore was crushed underground and transported to the surface by means of a conveyor belt. Total estimated reserves and resources were more than 10 Mt grading 11.4% zinc and 1.1% lead. At present mining rates, Galmoy had a life expectancy of 15 years (Potts, 2000).

The Lisheen Mine's two ore bodies—Main Zone and Derryville—initially were planned to produce 160,000 tons per year (t/yr) of zinc metal increasing to 300,000 t/yr of zinc and 40,000 t/yr of lead at full production. The deposit is about 30 meters (m) thick with depths up to 300 m. The two bodies contained an estimated 19 Mt of recoverable reserves at an average grade of 13% zinc and 2.2% lead. When Lisheen reaches full production, Ireland will become the world's seventh largest zinc producer after China, Canada, Australia, Peru, the United States, and Mexico and will account for almost 8% of world output (Brown, 2000).

Outokumpu was to exploit the southwestern extension (SWEX) of the ore body at the Tara Mine. The investment of $42.5 million (€47 million) was expected to extend the life of the mine for 8 years at a production level of more than 200,000 t/yr. The investment, including a new 10,000 t/d ore-handling system, was required in order to mine an estimated 10 Mt of reserves averaging 9% zinc and 2% lead. Production from the SWEX was planned to begin in 2001, and full capacity was expected to be attained by 2004. Exploration was ongoing to further extend reserves (Mining Journal, 2000b).

Angus and Ross plc, a junior United Kingdom company, was granted eight contiguous licenses covering an area of 300 square kilometers (km^2) in Counties Carlow and Wexford in southern Ireland for the exploration of tantalum. The Geological Survey of Ireland (GSI) had recorded high geochemical values for tantalum in several locations that were associated with lithium-bearing (spodumene) pegmatites on the eastern flank of the Leinster granite (Mining Magazine, 2000).

Industrial mineral production, which included barite and gypsum, remained relatively constant. Several metals and industrial minerals projects were awaiting to be granted planning permissions and mining leases before moving into development and production.

Cambridge Mineral Resources plc was continuing with diamond and sapphire exploration work. Drilling on the Donegal diamond prospect reportedly discovered rocks that Cambridge said could be lamprolites, a host for major diamond deposits such as those at the New England Fold Belt, in New South Wales, Australia, where a significant amount of diamonds and sapphires have been mined. Cambridge's six prospecting licenses cover an area of about 250 km^2, which was considered sufficiently large enough to enclose a kimberlite/lamproite occurrence (Cambridge Mineral Resources plc, January 19, 2000, Press release, accessed February 1, 2001, via URL http://www.cambmin.co.uk/media.html).

Natural gas production continued off the southern coast of Ireland near Cork. Reserves were not disclosed, and the production from the fields was being carefully managed to extend the life of the fields.

Enterprise Oil plc of the United Kingdom acquired ARCO Ireland Offshore Inc., which owns the Irish exploration interests of Atlantic Richfield Corp. This purchase expanded Enterprise's exploration activities into the Atlantic margin (Oil & Gas Journal, 2000).

Tosco Corp. of the United States entered into an agreement to purchase Irish National Petroleum Corp. Ltd. The assets included a 75,000-barrel-per-day (bbl/d) refinery located in Cork and an 8.5-million-barrel crude oil and oil products storage complex at Gantry Bay. The refinery also produced 30,000 bbl/d of low-sulfur straight run fuel oil. Tosco was the largest independent oil refiner and marketer of petroleum products in the United States, with revenues exceeding $23 billion per year. This was Tosco's first investment outside the United States. Within the United States, Tosco completed the purchase of 1,740 retail gasoline and convenience outlets from Exxon/Mobile Corp. in March (Tosco, July 31, 2000, At a glance, accessed March 21, 2001, at URL http://www.tosco.com/internet_repository/tosco/71.html).

The GSI was responsible for the development of minerals information and for the technical management of the state mineral licensing and leasing system. Ireland's geology includes several lithologic units and tectonic features that are favorable for the occurrence of several types of mineral resources from base metals to industrial minerals. The GSI provided technical assistance to the exploration and mining industry in defining these occurrences.

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Dublin 4, Ireland
Geological Survey of Ireland
Beggars Bush, Paddington Rd.
Dublin 4, Ireland

TABLE 1
IRELAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Alumina		1,234	1,273	1,200	1,200 e/	1,200
Iron and steel, steel, crude		340	337	358	335	360 3/
Lead:						
Mine output, Pb content	tons	45,344	45,149	36,528	43,831	58,600
Metal, refined, secondary e/	do.	10,400	12,000	12,000	12,996 3/	10,800
Silver, mine output, Ag content	kilograms	14,706	13,284	10,800	15,300	16,000
Zinc, mine output, Zn content	tons	164,168	194,796	182,000	226,100	266,000
INDUSTRIAL MINERALS 4/						
Cement, hydraulic e/		1,933 3/	2,100	2,400	2,000 e/	2,000
Gypsum		422	477	450	450 e/	450
Lime e/		100,000	100,000	100,000	100,000	100,000
Nitrogen, N content of ammonia		377	465	458	401	410 3/
Sand and gravel e/ 5/		12,000	12,000	12,000	12,000	12,000
Stone and other quarry products: e/						
Limestone	million tons	1	1	1	1	1
Other 6/	tons	40,000	35,000	36,000	35,000	35,000

See footnotes at end of table.

TABLE 1--Continued
IRELAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
MINERAL FUELS AND RELATED MATERIALS						
as, natural, marketed	million cubic meters	2,737	2,417	2,400	2,500 e/	2,500
eat:						
For horticultural use e/		400	400	400	350	400
For fuel use:						
Sod peat e/ 7/		1,702 3/	1,000 r/ e/	1,000 r/ e/	1,600	1,600
Milled peat 8/		4,876	2,851	3,000 e/	4,000 e/	3,500
Total		6,578	3,851	4,000 e/	5,600 e/	5,100
Peat briquets e/		285	253	300	300	300
etroleum refinery products: e/ 9/						
Liquefied petroleum gas	thousand 42-gallon barrels	350	350	498 3/	522 3/	500
Naphtha	do.	350	350	799 3/	1,037 3/	1,000
Gasoline, motor	do.	3,000	3,000	3,868 3/	3,987 3/	4,000
Distillate fuel oil	do.	5,000	5,000	7,443 3/	8,385 3/	8,000
Residual fuel oil	do.	5,000	5,000	6,693 3/	7,206 3/	7,000
Refinery fuel and losses	do.	400	400	147 3/	210 3/	200
Total	do.	14,100	14,100	19,448 3/	21,347 3/	20,700

Estimated. r/ Revised.

Estimated data are rounded to no more than three significant digits; may not add to totals shown.

Table includes data available through March 2001.

Reported figure.

Ireland also produces significant quantities of synthetic diamond and is the major supplier to the United States. Output, however, is not quantitatively eported, and general information is inadequate to make reliable estimates of output levels.

Excludes output by local authorities and road contractors.

Includes clays for cement production, fire clay, granite, marble, rock sand, silica rock, and slate.

Includes production by farmers and by Bord Na Mona (Government Peat Board).

Includes milled peat used for briquet production.

From imported crude oil.

TABLE 2
IRELAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facility	Annual capacity
Alumina		Glencore International AG	Aughinish Island, County Limerick	1,000
Barite		Magobar Ireland Ltd.	Silvermines, County Tipperary	240
Cement		Irish Cement Ltd.	Plants in Limerick and Platin	2,000
Lead-zinc		Anglo American plc, 50%; Ivernia West plc, 50%	Lisheen Mine, County Kilkenny	160
Do.		Arcon International Resources plc	Galmoy Mine, County Kilkenny	135
Do.		Outokumpu Oyj	Tara Mine, Navan, County Meath	215
Natural gas	million cubic feet	Marathon Oil Co.	Kinsale Head Field, Celtic Sea	75,000
Peat		Bord Na Mona (Government Peat Board)	Production mainly in midlands	4,200
Petroleum, refined	barrels per day	Irish National Petroleum Corp. Ltd. (Tosco Corp., 100%)	Whitegate, near Cork	75,000
Steel		Irish Ispat (Ispat International Group)	Haulbowline, near Cork	500

THE MINERAL INDUSTRY OF

ITALY

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Italy has been a significant processor of imported raw materials as well as a significant consumer and exporter of mineral and metal semimanufactured and finished products. The world's largest producer of pumice and related materials, it produced almost one-half of the world's output. Also the world's largest feldspar producer, it produced about one-fourth of the world's output. The country was the world's 8th and 10th largest producer of crude steel and cement, respectively. Italy was also an important producer of dimension stone and marble (Metal Bulletin, 2000e).

Italy's gross domestic product, adjusted for inflation, grew at a rate of 2.8% in 2000 as the Italian Government continued to exercise budget austerity and to reduce its role in the economy through privatization of its assets. Italy had the world's sixth largest economy in 2000 and continued to maintain an open economy. The Government has traditionally played a dominant role in the economy through regulation and through ownership of large industrial and financial companies. Privatization and regulatory reform since 1994 have reduced that presence. The Government, however, retained a potentially blocking "golden share" in all the industrial companies privatized thus far (U.S. Department of State, 2001).

Italy's mineral sector declined in 2000. Among the metallic ores, lead and zinc were mined, although production was minimal and decreasing. Most of the small output of these ores came from the Silius Mine in Sardinia.

Industrial mineral production, which included construction materials, was the most important sector with overall output remaining about the same as that of 1999. Domestic production of natural gas and petroleum decreased (table 1).

Italy was the slowest growing country among the 11 founding members of the European Economic and Monetary Union and was expected to remain so through 2001. The indices of industrial production are listed in table 2.

Private and public companies own facilities for mining and processing minerals and mineral products. Some enterprises were under State control for economic reasons and to maintain employment (table 3). The Government was proceeding with privatization efforts to divest its holdings in aluminum and a number of other industrial sectors.

Commodity Analysis

Metals

Aluminum.—In 2000, Eurallumina S.p.A. raised the capacity of its alumina refinery to 1 million metric tons per year (Mt/yr) from 950,000 metric tons per year (t/yr). Eurallumina sourced 90% of its bauxite requirements from Comalco Ltd.'s Weipa Mine in Australia and 10% from Comalco's Boké Mine in Guinea. Eventually, bauxite supplied by Boké will be phased out, and Weipa will furnish all Eurallumina's requirements. Comalco owned 56.2% of Eurallumina (Eurallumina S.p.A., [undated], The company, accessed June 19, 2001, at URL http://www.eurallumina.com/eursoceng.htm).

Copper.—Enirisorse S.p.A., which was the largest producer of refined copper in Italy, accounted for about one-half of Italy's copper output. Italy's refined copper production averaged about 89,000 t/yr between 1993 and 1997 and dropped significantly in 1998 and 1999 owing to availability and the price of scrap material. Scrap, ashes, slag, and other residues imported from other Western European countries were the major sources of the copper produced in Italy. Copper mines in Italy were not significant, and imports of ore were small.

Gold.—Gold Mines of Sardinia Ltd. (GMS) [a joint venture of Gold Mines of Sardinia Ltd. (70%) and Progemisa S.p.A. (30%)] operated the Furtei Mine, which is located north of Cagliari. Furtei was the first gold mine of GMS and the first gold mine in Italy.

GMS reported that the latest drilling results from the Osilo project in northern Sardinia confirmed a major epithermal gold deposit. The company planned to raise $4 million by way of private placement to fund the further development of the Furtei and the Osilo mines. GMS's third project was an exploration program on a new area of 2,800 square kilometers. The company was anticipating that it would eventually have six separate gold mines on Sardinia (Metal Bulletin, 2000b).

GMS signed an agreement to enter into a strategic alliance with Homestake Mining Co. of the United States; the agreement was expected to help accelerate gold exploration in Sardinia. It provides Homestake with a 3-year option to select up to 20% of the GMS gold-prospective ground for inclusion in a joint venture with Homestake holding a 75% interest and GMS, a 25% interest. Homestake would be responsible for carrying 100% of all joint-venture costs through the first of any feasibility studies prepared by the venture. Homestake and GMS expected to collaborate with respect to exploration efforts on the island (Metal Bulletin, 2000e).

Lead and Zinc.—Italy imported most of its supplies of lead and zinc concentrates. Within Italy, the small amount of lead and zinc concentrate production came from Enirisorse's mines in Sardinia. In August, Enirisorse signed a contract with the Italian consortium Cogefin S.p.A. for the sale of the Crotone zinc smelter. This was considered to be the first step in the consortium's acquisition of Crotone. It will be a while, possibly 3 years, before the idled smelter reopens owing to the need for modernization of the plant and the resolution of environmental issues (Metal Bulletin, 2000a).

Zincatura Bresciana S.p.A. opened a new hot-dip zinc-galvanizing plant near Brescia. The $11 million plant took 2 years to complete and has an increased capacity of 65,000 t/yr. Zincatura closed an existing 40-year-old plant and moved to the new site. The plant will treat a wide range of metallic products, which will include larger items that the previous plant was not equipped to handle (Metal Bulletin, 2000d).

Steel.—In Italy, all the steel was produced by private companies after the completion of a privatization program by the Government between 1992 and 1997. About 60% of Italian steel was produced by electric-arc furnaces, and 40% was produced by basic oxygen furnaces. Production reached a 5-year high in 2000 because the country's steel demand increased substantially. Apparent steel consumption in the first half of 2000 was up by 10% from the same period in 1999, but a large portion of the increase was due to a rise in merchants' and consumers' stocks; real consumption was only 6% ahead of the same period in the previous year. Mills worked at 72.4% of their capacity from January to September, up from 68% in the equivalent period in 1999. The industry appeared to be benefiting from the restructuring of the sector that took place in the early 1990s; some 25 plants had been closed, and 6.6 Mt/yr of capacity was eliminated (Metal Bulletin, 2000c).

Industrial Minerals

Cement.—Italy was the second largest cement producer of the European Union (EU) after Germany. Italcementi Fabbriche Riunite Cemento S.p.A. was the largest of Italy's cement producers with 28 plants (table 3). Italy was a net exporter of cement.

Clay.—Although most of Italy's bentonite ores were mined in Sardinia, several processing plants were on the mainland. More than one-half of the country's bentonite production came from Industria Chimica Carlo Laviosa S.p.A. The company's main mining activity was in the Pedra de Fogu and the Puntenuova areas of Sardinia. Production from these areas fed the processing plants at Livorno and Oristano on Sardinia.

Montmorillonite clay (white bentonite) was quarried at S`Aliderru in northwestern Sardinia. Caffaro S.p.A., which operated in Sardinia, was Italy's only producer of acid-activated montmorillonite. The clay was shipped to the company's plant at Porto Marghera near Venice. Several small bentonite producers operated at Foggia and at Pietracuta di San Leo.

Feldspar.—Italy was a significant producer of feldspar and feldspathic minerals (table 1). These materials are important constituents of ceramic tile. Italy accounted for about 30% of world tile output and more than 50% of the total tile produced in the EU (Industrial Minerals, 2000).

Marble.—Marble occurs in many localities from the Italian Alps to Sicily and is quarried at hundreds of operations. The most important geographic area for producing white marble is in the Apuan Alps in Tuscany, particularly near the town of Carrara. Lombardy, the Po Valley, Puglia, Sicily, and Verona-Vincenza are important colored-marble-producing areas. About one-half of production was in block form. About one-half of the total production was exported. Other major marble-producing areas include the Valle di Susa, near Turin, and Benevento, northeast of Naples.

Potash.—Production of potash remained suspended in 2000. The main reasons were the restricted availability of ground water owing to a severe drought and the inability to remove waste material and mine water owing to environmental and ecological concerns. In Sicily, the underground mines that were previously operating at Pasquasia, Racalmuto, and Realmonte remained on care and maintenance.

Pumice and Pozzolan.—Italy was a significant producer of pumice and pozzolan (table 1). The Mediterranean island of Lipari, 40 kilometers (km) off the northern coast of Sicily, was the center of the Italian pumice industry, where two companies—Pumex S.p.A. and Sta Siciliana per i'Industria ed il Commercio della Pomice di Lipari S.p.A. (Italpomice S.p.A.)—quarried pumice for world markets. Pumex, with about a 600,000-t/yr capacity, was Italy's largest pumice producer. The company quarried the Mount Pelato deposit on Lipari.

Talc.—White talc was produced by Luzenac Val Chisone S.p.A., which operated an underground mine at Pinerolo near Turin. The white talc, which is mined from metamorphic rocks, is of very high quality. Talco Sardegna S.p.A. operated an open pit mine at Orani.

Mineral Fuels

EU membership has initiated important changes in Italy's energy sector by requiring privatization of dominant energy monopolies. Hence, the sector has been undergoing considerable restructuring in recent years. The state-held oil and gas conglomerate Ente Nazional/Idrocarburi (ENI), its main subsidiaries Agip S.p.A. (hydrocarbons exploration and production) and the state- owned electricity company Snam S.p.A. (gas supplies and distribution), and Ente Nazional per l'Energia Electtrica (ENEL) had to be privatized. ENI and ENEL became joint-stock companies. The Government sold off shares of ENI between 1995 and 1999 and held 35% of the company in 2000. Privatization of ENEL has stalled. According to EU directives, plans for privatization must proceed quickly in coming years (U.S. Energy Information Administration, November 2000, Italy—Background, Country analysis Briefs, accessed July 11, 2000, at URL http://www.eia.doe.gov/emeu/cabs/italy.html).

Coal.—Italy was heavily dependent on imported coal. Most imports were from Russia, South Africa, the United States, and China, listed in declining order of importance. Lignite coal was produced by ENEL. Extraction problems and environmental reasons caused a further reduction in output from ENEL's Santa Barbara Mine in Tuscany, which was the only lignite mine in Italy.

Geothermal Energy.—Geothermal energy was produced in the Larderello, the Monte Amiata, and the Travale areas in Tuscany. Exploration that used various geologic techniques has been actively pursued in these areas as well as research for power stations exploiting geothermal energy.

Petroleum.—Despite increasing domestic production of crude oil, Italy was less than 20% self-sufficient in energy and was heavily reliant on Libya and Algeria for its oil and gas supplies, respectively. The future does look brighter after determining the existence of an estimated 1.02 billion barrels of recoverable reserves in the southern Appennines region. Italy can lay claim to the largest onshore reserves on the continent. The Apennines range was considered to be Europe's most promising onshore development area (Oil & Gas Journal, 2000).

Outlook

Public and private spending on environmental controls is expected to grow, particularly in the areas of water treatment, transportation equipment and services, disposal of urban and industrial waste, remediation of soil contamination, and control of emissions.

Mining of metallic ores will likely remain at its low levels because of ore depletion and will eventually cease altogether. The metals-processing industry, which is based primarily on imported stocks, will continue to play an important role in Italy's economy. Italy is expected to remain a large producer of crude steel and a significant producer of secondary aluminum in the EU.

The role of the industrial minerals quarrying industry and preparation plants is expected to remain significant, especially in the production of barite, cement, clays, fluorspar, marble, and talc. Italy is expected to continue to be the world's leading producer of feldspar, feldspathic minerals, and pumice. The ceramics sector will likely be important, particularly regarding exports.

Domestic outputs of natural gas, crude petroleum, and petroleum refinery products are expected to grow, although Italy will continue to depend on imported coal, gas, and petroleum for most of its needs.

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Associazione Mineraria Italiana
Via delle Madonne, 20
00197 Rome, Italy

Ministero dell'Industria del Commercio e dell'Artigianato
Direzione Generale delle Minire
Via Molise, 2
00184 Rome, Italy

TABLE 1
ITALY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Aluminum:						
Alumina, calcined basis e/		881,000	913,000	930,000	973,000	950,000
Metal:						
Primary		184,377	187,719	186,953	187,281	190,000
Secondary		376,600	442,900	502,600	501,800	525,000
Antimony, oxides, gross weight 3/		800	800	700 e/	600 e/	600
Bismuth metal e/		5	5	5	5	5
Cadmium metal, smelter		296	287	328	360	284 4/
Copper, metal, refined, all kinds e/		85,800	85,700	29,100	28,500	70,000
Gold, Au content	kilograms	--	--	1,200	1,000 e/	1,000
Iron and steel, metal:						
Pig iron	thousand tons	10,427	11,348	10,704	10,622	11,219 4/
Ferroalloys:						
Electric furnace:						
Ferrochromium		29,915	11,295	11,487	12,000 e/	12,000
Ferromanganese		25,143	40,000 r/	49,000 r/	19,000 r/	40,000
Ferrosilicon e/		11,741 4/	12,000	12,000	12,000	12,000
Silicomanganese		100,353	100,000	70,000 r/	67,000 r/	90,000
Silicon metal		14,433 r/	12,619 r/	8,094 r/	6,257 r/	5,000
Other e/		10,000	10,000	10,000	10,000	10,000
Total e/		191,000	185,914 r/	160,581 r/	126,257 r/	165,000
Steel, crude	thousand tons	23,922	25,537	25,826	24,964	26,445 4/
Steel, hot rolled	do.	23,048	23,146	22,648	22,918 r/	23,858 4/
Lead:						
Mine output, Pb content		14,070	11,792	6,800	6,000 e/	2,000
Metal, refined:						
Primary		65,900	65,700	57,400	66,954	75,000
Secondary		143,900	145,900	141,900	148,354	160,000
Total		209,800	211,600	199,300	215,308	235,000
Manganese, mine output, Mn content		1,450	1,490	1,440 e/	1,200 e/	1,200
Silver metal	kilograms	9,100 e/	4,500	2,500	4,000 r/	4,000

See footnotes at end of table.

TABLE 1--Continued
ITALY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS--Continued						
Zinc:						
Mine output, Zn content		11,055	8,470	2,459	--	--
Metal, primary		269,000	268,300	231,600	145,318	168,000
INDUSTRIAL MINERALS						
Barite		80,463	26,300	36,000 e/	30,000 e/	30,000
Bromine e/		300	300	300	300	300
Cement, hydraulic	thousand tons	33,327	33,721	35,000	34,000	34,000
Clays, crude:						
Bentonite	do.	475	513	592	600	600
Refractory excluding kaolinitic earth e/	do.	784 4/	750	750	700	700
Fuller's earth e/	do.	26 4/	30	30	30	30
Kaolin e/	do.	126 4/	100	100	100	100
Kaolinitic earth e/	do.	9 4/	10	10	10	10
Diatomite e/		25,000	25,000	25,000	25,000	25,000
Feldspar	thousand tons	2,310	2,200 e/	2,748	2,700 e/	2,500
Fluorspar:						
Acid-grade		103,527	105,800	92,000 e/	95,000 e/	50,000
Metallurgical-grade		23,000	20,000	15,000 e/	15,000 e/	15,000
Total		126,527	125,800	107,000 e/	110,000 e/	65,000
Gypsum e/	thousand tons	1,275 4/	1,300	1,300	1,300	1,200
Lime, hydrated, hydraulic and quicklime e/	do.	3,500	3,500	3,500	3,500	3,500
Nitrogen, N content of ammonia	do.	397	445	409	367	408 4/
Perlite e/		60,000	60,000	60,000	60,000	60,000
Pigments, mineral, iron oxides, natural e/		500	500	500	500	500
Pumice and related materials: e/						
Pumice and pumiceous lapilli	thousand tons	600	600	600	600	600
Pozzolan	do.	4,000	4,000	4,000	4,000	4,000
Salt:						
Marine, crude e/ 5/	do.	600	600	600	600	600
Rock and brine	do.	2,941	3,500	3,300 e/	3,200 e/	3,200
Sand and gravel: e/						
Volcanic sand	thousand tons.	100	100	100	100	100
Silica sand	do.	2,950	3,000	3,000	3,000	3,000
Other sand and gravel		90,000	100,000	100,000	100,000	100,000
Sodium compounds: e/						
Soda ash	thousand tons	1,100	1,000	1,000	1,000	1,000
Sodium sulfate	do.	125	125	125	125	125
Stone: e/ 6/						
Calcareous:						
Alabaster	do.	25	25	25	25	25
Marble in blocks:						
White	do.	103	100	100	100	100
Colored	do.	3,000	3,000	3,000	3,000	3,000
Travertine	do.	2,610	2,500	2,500	2,500	2,500
Other:						
Granite	do.	67	100	100	100	100
Sandstone	do.	1,800	1,800	1,800	1,800	1,800
Slate	do.	107	100	100	100	100
Crushed and broken:						
Dolomite	do.	780	760	711 4/	700	700
Limestone	do.	120,000	120,000	120,000	120,000	120,000
Marl for cement	do.	14,000	15,000	15,000	1,500	1,500
Serpentine	do.	1,662	1,500	1,500	1,500	1,500
Quartz and quartzite	do.	29	30	30	30	30
Sulfur, recovered as elemental, in compounds, byproducts, other sources e/	do.	551	609	624	678 4/	693 4/
Talc and related materials e/		136,000	142,000	138,000	14,000	10,000

See footnotes at end of table.

TABLE 1--Continued
ITALY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
MINERAL FUELS AND RELATED MATERIALS						
Asphalt and bituminous rock, natural e/		29,646 4/	30,000	30,000	30,000	30,000
Coal:						
Lignite	thousand tons	223	203	156 r/	19 r/	14
Subbituminous, Sulcis coal		4,787	2,800	10 e/	5 e/	5
Coke, metallurgical	thousand tons	4,686	5,214	3,500 e/	4,825 r/	5,264 4/
Gas, natural e/	million cubic meters	20,218 4/	19,500 e/	19,000 e/	18,500	18,500
Natural gas liquids e/	thousand 42-gallon barrels	400	400	400	350	350
Petroleum:						
Crude	do.	36,994	36,720	42,923 r/	34,245 r/	35,000
Refinery products:						
Liquefied petroleum gas	do.	25,114	26,181	25,750	25,404 r/	27,446 4/
Gasoline	do.	160,000 e/	171,615	173,264	174,063 r/	175,576 4/
Naphtha	do.	30,000 e/	33,040	37,341	30,209 r/	30,000
Jet fuel e/	do.	24,000	24,000	25,000	25,000	36,440 4/
Kerosene e/	do.	35,000 e/	35,000	30,000	30,000	15,000
Distillate fuel oil	do.	220,000 e/	256,833	271,910	271,820 r/	262,226 4/
Residual fuel oil	do.	140,000 e/	112,180	114,226	104,948 r/	100,459 4/
Other	do.	35,000 e/	35,000 e/	38,850 r/	42,042 r/	46,137 4/
Refinery fuel and losses e/	do.	2,000	1,800	1,568 r/	1,778 r/	1,700
Total e/	do.	671,000	696,000	718,000 r/	705,000	695,000

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through May 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Antimony content is 83% of gross weight.

4/ Reported figure.

5/ Does not include production from Sardinia and Sicily, which was estimated to be 200,000 metric tons per year.

6/ Output of limestone and serpentine for dimension stone is included with "Stone: Crushed and broken." In addition to the commodities listed, a variety of other dimension stone was produced and previously listed, but available general information was inadequate for continued reliable estimation of output levels.

TABLE 2
ITALY: SELECTED INDICES OF PRODUCTION

(1990=100)

Sector	1997	1998	1999	2000 e/
General	110	112	112	112
Mining	110	112	112	112
Manufacturing	109	111	110	110
Electricity and gas	115	120	124	125

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no 12, December, p. 28.

TABLE 3
ITALY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Eurallumina S.p.A. (Comalco Ltd., 56.2%; Glencore, AG, 43.8%)	Plant at Portoscuso, Sardinia	1,000
Aluminum	Alcoa Italia S.p.A. (Alcoa Inc., 100%)	Smelters at Porto Vesme, Sardinia, and Fusina, near Venice	188
Asbestos	Amiantifera di Balangero S.p.A.	Mine at Balangero, near Turin	100
Barite	Bariosarda S.p.A (Ente Mineraria Sarda)	Mines at Barega and Mont 'Ega, Sardinia	100
Do.	Edem S.p.A. (Government)	Mines at Val di Castello, Lucca	20

TABLE 3--Continued
ITALY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Barite--Continued:	Edemsarda S.p.A. (Soc. Imprese Industriali)	Mines at Su Benatzu, Santo Stefano, and Peppixeddu, on Sardinia	20
Do.	Mineraria Baritina S.p.A	Mines at Marigolek, Monte Elto, and Primaluna, near Milan	20
Bauxite	Sardabauxiti S.p.A. (Cogein S.p.A., 40%; Comtec, 40%, Icofin Co., 20%)	Mine at Olmedo, Sardinia	350
Bentonite	Industria Chimica Carlo Laviosa S.p.A	Mines and plant on Sardinia Island and a plant near Pisa	250
Cement	52 companies, of which the largest are:		
Do.	Italcement Fabbriche Riunite Cemento S.p.A.	28 plants, of which the largest are Calusco, Monselice, and Ccollefero	(15,000)
Do.	Unicem S.p.A.	12 plants, of which Guidonia, Lugagnano, Morano, Piacenza, S'Arcangelo di Romagna, and Settimello are the largest	(10,000)
Do.	Cementerie del Tirreno S.p.A. (Cementir)	6 plants at Arquasta Scivia, Livorno, Maddaloni, Napoli, Spoleto, and Taranto	(5,300)
Copper, refined	Enirisorse S.p.A. (Government)	Refineries at Porto Marghera, near Venice, and Pieve Vergonte	46
Do.	Europa Metalli - LMI S.p.A.	Refineries at Campo Tizzoro, Fornaci di Barga, and Villa Carcina	26
Do.	Chimet S.p.A.	Refinery at Arezzo	13
Feldspar	At least 5 companies, of which the largest are:		1,500
	Maffei S.p.A.	Surface mines at Pinzolo, Sondalo, and Campiglia Marittima	(200)
Do.	do.	Underground mine at Vipiteno	(300)
Do.	Miniera di Fragne S.p.A.	Surface mine at Alagna Valsesia	(60)
Do.	Sabbie Silicee Fossanova S.P.A. (Sasifo)	Surface mine at Fossanova	(30)
Gold kilograms	Gold Mines of Sardinia Ltd., 70%; Progemisa S.p.A., 30%	Furtei Mine near Cagliaria, Sardinia	1,400
Lead-zinc, ore	Enirisorse S.p.A. (Government)	Mines at Masua, Monteponi, and Sardinia	60
Lead, metal	do.	Refinery at San Gavino, Sardinia	80
Do.	do.	Kivcet smelter and Imperial smelter at porto Vesme, on Sardinia	114
Lignite	Ente Nazional per l'Energia Electtrica (ENEL)	Surface mines at Pietrafitta and Santa Barbara	1,500
Magnesium, metal	Societa Italiana Magnesio S.p.A. (INDEL)	Plant at Bolzano	8
Marble	A number of companies, largest of which include:	Quarries in the Carrara and Massa areas	2,000
	Mineraria Marittima Srl		(500)
	Industria dei Marmi Vicentini S.p.A.		(300)
	Figaia S.p.A.		(100)
Petroleum, crude	Ente Nazional/Idrocarburi (ENI) Government	Oilfields: offshore Sicily, the Adriatic Sea, and onshore in the Po River Valley	90
Petroleum, refined thousand 42-gallon barrels per day	do.	About 30 refineries	2,000
Potash ore	Industria Sali Otassici e Affini per Aziono S.p.A.	Underground mines at Corvillo, Pasquasia, Racalmuto, and San Cataldo, in Sicily	1,300
Do.	Sta Italiana Sali Alcalini S.p.A. (Italkali)	Underground mines at Casteltermini and Pasquasia, Sicily	700
Pumice	Pumex S.p.A.	Quarries, Lipari Island, north of Sicily	600
Do.	Sta Siciliana per i'Industria ed il Commercio della Pomice di Lipari S.p.A. (Italpomice S.p.A.)	do.	200
Pyrite	Nuova Solmine S.p.A.	Underground mines at Campiano and Niccioleta	900
Salt, rock	Sta Italiana Sali Alcalini S.p.A. (Italkahi)	Underground mines at Petralia, Racalmuto, and Realmonte, Sicily	4,000
Do.	Solvay S.p.A.	Underground mines at Buriano, Pontteginori, and Querceto, Tuscany	2,000
Steel	Ilva Laminati Piani S.p.A. (Riva Group)	5 steel plants, the largest of which is:	4,000
		Taranto	(1,300)
Do.	Riva S.p.A	About 5 plants	7,000
Do.	AFV Beltrame S.p.A.	Steel plant at Vicenza	700
Talc	Luzenac Val Chisone S.p.A.	Mines at Pinerolo, near Turin, and at Orani, Sardinia	120
Do.	Talco Sardegna S.p.A.	Mine at Orani, Sardinia	20
Zinc, metal	Enirisorse S.p.A. (Government)	Plants at Crotone and Porto Vesme, Sardinia, and Porto Maghera, near Venice	349

THE MINERAL INDUSTRY OF

MALTA

By Harold R. Newman

Malta's mineral industry relies mainly on trade and the storage of crude oil and refinery products, as well as other nonfuel mineral commodities. The mineral industry, consisting mainly of limestone and salt production, contributed less than 0.5% to the gross domestic product.

Malta was an important transshipment center in the Mediterranean area. The country's strategic location in the middle of the shipping lanes that connect the two ends of the Mediterranean Sea and natural ports are its major assets. The transshipment and reexport of goods were significant to the country's economy along with the storage of petroleum and refinery products.

The entrepôt activities of Malta continued. The European Union (EU) remained the main source of Maltese imports. Major suppliers were Germany, France, Italy, and the United Kingdom. EU countries, mainly Italy, Germany, France, and the United Kingdom, were also major destinations for exports and reexports (Central Office of Statistics—Malta, November 22, 2000, Industry statistics, accessed February 13, 2001, at URL http//www.nso.govt.mt/cosnews/news00/news8700.htm).

Limestone quarries produce crushed aggregates for use in road construction, lime manufacture, and as a concrete additive. Construction companies produce building blocks from their own quarries using globigerina limestone, known locally as franka stone. These blocks are used for local construction purposes (table 1).

With the help of foreign companies, the Maltese Government was exploring offshore areas for petroleum. Previous seismic work by the Maltese Government in the 1980s and by Texaco Corp. from 1990 to 1992 resulted in the identification of several prospects. The prospects are located along the same geological trend as several Italian oilfields offshore Sicily. In 1997, agreements were signed with Agip SpA of Italy for the exploration of an area off the north coast and with Roc Oil Co. Ltd. of Australia for the exploration of an area off the south coast of Malta. In 1998, Hardman Resources NL of Australia signed an agreement granting rights to explore for hydrocarbons off the east coast of Malta. Exploration was initiated in 1999 and continued in 2000 (Oil Exploration Department—Malta, [undated], Oil exploration in Malta, accessed September 12, 2000, at URL http://www.magnet.mt/home/oil-exp).

Malta would like to become a member in the EU and was adopting EU practices and procedures. The country was pursuing a policy of gradual economic liberalization, taking some steps to shift emphasis from reliance on direct government intervention and control to policy regimes that allow a greater role for market mechanisms in trade and financial policies. The Government established a national privatization committee as part of its bid to become an EU member. Selling such state-owned units as the country's port authority Malta Freeport Corp. would boost the country's candidacy by cutting public spending and ensuring a more competitive economy.

Malta Freeport, which was set up to develop the port to be able to compete, offers modern transshipment facilities, storage, and assembling and processing operations, including an oil terminal with bunkering facilities. Companies licensed to operate within Malta Freeport were exempt from payment of customs tariffs, income tax, and stamp duties on their operations within the port. These incentives were available to both domestic and foreign companies. In 1999, the Malta Freeport handled 1.2 million containers (Elliott, 1999).

Reference Cited

Elliott, Nick, 1999, Transshipment port on Malta headed for privatization: The Journal of Commerce, v. 420, no. 29479, May 28, p. 2B.

TABLE 1
MALTA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

Commodity 2/		1996	1997	1998	1999	2000
Limestone	thousand metric tons	2,000	2,000	2,000	2,000	2,000
Salt	metric tons	30	30	30	30	30

1/ Table includes data available through March 2001.

2/ In addition to listed commodities, small amounts of cement, fertilizer, lime, and plaster are produced, but available information is inadequate to make reliable estimates of output levels.

THE MINERAL INDUSTRY OF

THE NETHERLANDS

By Harold R. Newman

In terms of world production, the Netherlands was a modest producer of metallic and nonmetallic minerals and mineral products. It was very important, however, as a regional producer of natural gas and petroleum for the European market and played a major role as a transshipment center for mineral materials entering and leaving continental Europe.

The Dutch economy, which has been expanding for 3 years, performed well again in 2000 with a 4.0% growth in the gross domestic product. Growth was being driven chiefly by increases in exports of goods and services, consumption, and investment. Much of the Netherlands' reputation as a trading nation was based on the performance of Dutch industry. Commerce and industry are closely related: industrial products accounted for 70% of exports and were produced in a broad range of sectors (Netherlands Foreign Trade Agency, February 2001, The Dutch economy in 2000—Summary, accessed March 19, 2001, at URL http://www.hollandtrade.com/engels/en020101.htm).

Rotterdam, which was the world's largest container port and a major European transportation hub, remained extremely important as a shipping and storage center. With the ever expanding inland transportation systems, goods entering or leaving Rotterdam can originate in or be destined for almost anywhere in continental Europe.

Production of mineral commodities generally remained the same or dropped slightly during 2000. The high cost of social benefits contributed to the production costs of Dutch products thus making them less competitive on the world market. The only mining operations left in the Netherlands in 2000 were involved in the extraction of limestone, peat, salt, and sand and gravel. The metal-processing sector relied almost exclusively on imported ores and concentrates and scrap (table 1).

The Government has reduced its role in the economy since the 1980s, and privatization has continued with little debate or opposition. Nevertheless, the state dominated the energy sector and played a large role in the aviation, chemicals, steel, telecommunications, and transportation sectors (table 2).

The Central Bank announced plans to sell 300 metric tons (t) of gold, which was about a third of the nation's gold reserve. The timetable was for 100 t to be sold in 2000, and the remaining 200 t to go from 2001 to 2005. The bank had sold 400 t in 1992 (Engineering and Mining Journal, 2000).

In midyear 1999, Koninklijke Hoogovens BV and British Steel plc of the United Kingdom announced the two companies would be merged by 2000, thus creating the world's third largest steelmaker after Posco Steel of the Republic of Korea and Nippon Steel of Japan. The newly formed company would be called the Corus Group. Aside from its large capacity—23 million metric tons combined output of crude steel in 1998—Corus would have the capacity to produce multiple metals, including stainless steel from the United Kingdom and aluminum from the Netherlands. Merging the two companies was expected to generate operational savings of about $285 million in 3 years (Metal Bulletin Monthly, 1999).

In 2000, Budel Zinc BV's smelter received its first shipment of zinc concentrates from its parent company Pasminco Europe BV's new Century Mine in Australia. The 10,000 t that was received was stockpiled, and Budel continued to use concentrates from its additional sources before switching to Century material. Century concentrates had been tested, and no quality problems were reported (Metal Bulletin, 2000).

The Netherlands was active on the international energy supply scene in more than one respect. The country supplied energy to Europe by pipelines and other methods and served as the entrepôt for oil products for northwestern Europe.

After Aardolie Maatschappij BV struck one of the largest gasfields in the world in the north of the Netherlands in 1959, the decision was made to begin drilling for natural gas and petroleum in the North Sea. Natural gas has become the most important mineral fuel produced in the Netherlands. The Groningen Gasfield at Slochteren is one of the world's largest producing natural gasfields (The Netherlands Foreign Trade Agency, April 2000, The upstream gas and oil industry in the Netherlands, accessed September 19, 2000, at URL http://www.hollandtrade.com/engels/en020418.htm).

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Engineering and Mining Journal, 2000, Netherlands: Engineering and Mining Journal, v. 201, no. 2, February, p. 48.

Metal Bulletin, 2000, Budel receives first shipment of zinc concentrates: Metal Bulletin, no. 8447, February 3, p. 7.

Metal Bulletin Monthly, 1999, Men of metal: Metal Bulletin Monthly, no. 347, November, p. 8.

Major Sources of Information

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Richard Holkade, 10
2000 AD Haarlem
The Netherlands
Ministry of Economic Affairs
2500 EC The Hague
The Netherlands

TABLE 1
NETHERLANDS: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/		1996	1997	1998	1999	2000 e/
METALS						
Aluminum metal:						
Primary		227,027	231,800	264,000 e/	286,400	300,000
Secondary		150,000	150,400	102,000	105,000	105,000
Cadmium metal, primary		603	718	739	731	730
Iron and steel:						
Ore, sintered (from imported ore)		4,250,000 e/	4,250,000 e/	3,376,000	3,094,000	3,000,000
Metal:						
Pig iron, including blast-furnace ferroalloys (if any)		5,545,000	5,804,000	5,561,000	5,307,000	4,969,000 4/
Steel:						
Crude		6,325,000	6,640,000	6,379,000	6,077,000	5,667,000 4/
Semimanufactures		4,810,000	5,175,000	4,964,000	5,000,000 e/	5,000,000
Lead, metal, refined, secondary		22,000 e/	19,500 e/	13,200	19,900	20,000
Zinc, metal, primary		207,400	208,800	218,700	221,400	215,000
INDUSTRIAL MINERALS						
Cement, hydraulic e/		3,140,000	3,230,000	3,200,000	3,200,000	3,200,000
Magnesium compounds: e/						
Chloride		125,000	25,000	25,000	23,000	25,000
Oxide		100,000	10,000	10,000	10,000	10,000
Nitrogen, N content of ammonia	thousand tons	2,653	2,478	2,350 e/	2,430 e/	2,540
Salt, all types e/	do.	5,530 4/	5,500	5,500	5,000	5,000
Sand, industrial e/	do.	24 r/	24 r/	14 r/	15 e/	15
Sodium compounds, n.e.s.: e/						
Carbonate, synthetic		400,000	400,000	400,000	350,000	350,000
Sulfate:						
Natural		20,000	20,000	20,000	20,000	20,000
Synthetic		15,000	15,000	15,000	15,000	15,000
Sulfur: e/						
Elemental byproduct:						
Of metallurgy		150,000	150,000	131,000	129,000	84,000 4/
Of petroleum and natural gas		150,000	138,000	432,000	445,000	428,000 4/
Total		300,000	288,000	563,000	574,000	512,000 4/
Sulfuric acid, 100% H_2SO_4 e/		1,250,000	1,250,000	1,250,000	1,000,000	1,000,000
MINERAL FUELS AND RELATED MATERIALS						
Coke, metallurgical		2,800,000 e/	2,800,000 e/	2,829,000	2,247,000	2,300,000
Gas:						
Manufactured e/	million cubic meters	10,000	10,000	10,000	10,000	10,000
Natural:						
Gross	do.	89,700	80,000 e/	76,331	68,528	70,000
Marketed	do.	86,000 e/	86,000 e/	75,201	67,228	68,000
Natural gas liquids e/	thousand 42-gallon barrels	170,000	170,000	170,000	160,000	170,000
Petroleum:						
Crude	do.	21,086	21,276	19,164	19,000 e/	20,000
Refinery products:	do.					
Liquefied petroleum gas	do.	3,600 e/	3,600 e/	3,456	4,210	4,200
Mineral jelly and wax	do.	600 e/	600 e/	936	990	900
Gasoline, motor	do.	75,000 e/	75,000 e/	76,653	78,948	80,000
Naphtha and white spirit	do.	50,000 e/	50,000 e/	45,960	45,195	45,000
Jet fuel	do.	40,000 e/	40,000 e/	50,808	55,816	50,000
Kerosene	do.	500 e/	500 e/	488	473	500
Refinery gas	do.	20,000 e/	20,000 e/	11,858	11,480	12,000
Lubricants	do.	3,800 e/	3,800 e/	4,459	4,375	4,500
Residual fuel oil	do.	85,000 e	85,000 e/	102,605	81,127	81,000
Bitumen	do.	4,500 e/	4,500 e/	4,499	4,260	4,400
Unspecified	do.	25,000 e/	25,000 e/	31,913	33,313	30,000
Total	do.	308,000 e/	308,000 e/	333,635	320,187	313,000

e/ Estimated. r/ Revised.

1/ Table includes data available through March 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ In addition to the commodities listed, the Netherlands produced construction materials, such as sand and gravel, but output was not reported, and no basis exists to make reliable estimates of output.

4/ Reported figure.

TABLE 2
NETHERLANDS: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facility	Annual capacity
Aluminum				
Primary		Pechiney Nederland NV	Smelter at Vlissingen	175
Do.		Corus Group	Smelter at Delfzijl	100
Secondary		Alumax Recycling BV	Smelter at Kerkade	50
Cadmium	tons	Budelco BV (Australian Overseas Smelting Pty. Ltd, 50%; Kempensche Zinkmaatschappij Zincs de la Campine BV, 50%)	Plant at Budel-Dorplein	650
Cement		ENCI Nederland BV (Eerste Nederlandse Cement Industrie NV)	10 plants at Maastrict	2,700
Do.		Cementfabriek IJmuiden BV	3 plants at IJmuiden	1,600
Do.		Cementfabriek Rozenburg BV	2 plants at Rozenburg	920
Lead		Hollandse Metallurgische Industrie Billiton BV	Electrolytic plant at Arnhem	35
Do.		Billiton Witmetaal BV	Electrolytic plant at Naarden	6
Limestone		Ankerpoort NV (Lhoist SA, 100%)	Mines at Maastricht and Winterswijk	600
Magnesia		Nedmag Industries Mining & Manufacturing BV	Plant at Veendam	130
Do.		MAF Magnesite BV	Plant at Schiedam	40
Natural gas	million cubic meters per day	Nederlandse Aardolie Maatschappij BV (NAM)	Groningen, Leeuwarden, Assen, and other onshore gasfields and several offshore wells in the North Sea	225
Petroleum, crude	barrels per day	AMOCO, CONOCO, and UNOCAL	766 wells (204 producing) including North Sea fields: Haven, Helder, Helm, Hoorn, Kotter, Logger, and Rijn	83,500 (63,000)
Do.	do.	NAM	Onshore fields: Berkel, DeLier, Ijselmonde, Meerkapelle, Pernis, West, Pinacke, Rotterdam, Schoonebeck, Werkendam, and Zoetemeer	(20,500)
Refineries		6 companies, of which the major ones are:		1,230,500
Do.	do.	Netherlands Refining Co.	Refinery at Rotterdam	(446,000)
Do.	do.	Shell Nederland Raffinaderij BV	Refinery at Pernis	(374,000)
Do.	do.	Esso Nederland BV	Refinery at Rotterdam	(175,000)
Do.	do.	Total Raffinaderij Nederland NV	Refinery at Vlissingen	(150,000)
Salt		Akzo Salt and Basic Chemicals BV	Mines at: Hengelo Delfzijl	4,000 (2,000) (2,000)
Sand, silica		Lieben Minerals BV	Mines at South Limburg	150
Sodium:				
Carbonate, synthetic		do.	Plant at Delfzijl	380
Sulfate, synthetic		do.	do.	600
Steel		Corus Group	Plant at IJmuiden	6,100
Zinc		Budel Zinc BV (Pasminco Europe BV)	Plant at Budel-Dorplein	215

THE MINERAL INDUSTRY OF

NORWAY

By Chin S. Kuo

Norway's economy is closely tied to its offshore oil and gas resources. In 2000, the country enjoyed healthy economic growth owing to higher world oil prices. The manufacturing sector is based on the country's cheap hydroelectric power. Norway has an extremely varied geology with a broad spectrum of minerals and rocks of interest for exploration and exploitation. The country's long shoreline and close proximity to the large European markets are major competitive advantages for some raw materials, particularly natural stone, aggregate, and certain industrial minerals. In addition, Norway was one of the world's largest exporters of oil, after Saudi Arabia. It also was one of the top gas suppliers to continental Europe.

Although the Government postponed partial privatization of Statoil ASA, the Ministry of Petroleum and Energy signaled policy changes in oil and gas activities. It also recommended changes in the tax system (World Oil, 2000b). The Government decided to work towards selling less than 50% of the state direct financial interest (SDFI), which accounted for 40% of Norway's offshore petroleum reserves, to Statoil, Norsk Hydro A/S, and other operators. This would allow large international oil companies to buy a stake in prize offshore petroleum fields. In addition, the Government decided to impose a new tax on sulfur dioxide emissions at the beginning of 2000.

Commodity Review

Metals

Aluminum.—Norsk Hydro was undertaking a major expansion at its Sunndal aluminum plant in western Norway, increasing production capacity to 321,000 metric tons per year (t/yr) with the addition of 234,000 t/yr in production capacity. The $608 million project would come on-stream in 2004. Total production capacity for extrusion ingots and foundry alloys made from primary and remelted metal would be 350,000 t/yr. The old Soderberg-type smelter of 66,000 t/yr capacity would be closed. Raw material to feed the expanded Sunndal production would come in part from Brazil's Alunorte alumina refinery in which Norsk Hydro purchased a 25.3% interest (Engineering & Mining Journal, 2000b). The company also was considering investing a further $67 million in increasing the anode production capacity of its Ardal Karbon plant.

Some of Norsk Hydro's workers were taking part in a strike at the extrusion plant at Raufoss, but smelting operations and metal shipments were not affected. The plant used about 45,000 t/yr of aluminum. The company's other metals operations were not affected by the strike (Metal Bulletin, 2000e).

Elkem A/S planned to invest in boosting capacity at its two aluminum smelters. A brownfield expansion at the smelters composing Elkem Aluminium [a 50-50 joint venture with Alcoa Inc. (formerly Aluminum Co. of America)] would add another 105,000 t/yr of production capacity, a 42% increase (Metal Bulletin, 2000a).

Base and Precious Metals.—Kenor ASA and ScanMining, partners in the ScaNor Mining joint-venture company, reported that the exploration program at the Lake Gjedde gold property in 1999 had identified two new polymetallic anomalies. Two further prospecting targets were identified at Kobbfoss containing copper, gold, and zinc and at Finntjorna containing copper and gold (Mining Magazine, 2000).

Rio Tinto plc and Boliden Mineral AB, owners of Norway's Norzink A/S smelter, extended the terms of the letter of intent under which Outokumpu Oyj of Finland could acquire Norzink until the end of January 2001. The extension was needed to enable the parties to finalize the negotiations. Norzink was conducting a feasibility study for a production increase to 270,000 t/yr from 145,000 t/yr of zinc at its Odda zinc refinery. The study was slated for completion in mid-2001. The plant also produced 300 t/yr of cadmium and 27,000 t/yr of aluminum fluoride (Engineering & Mining Journal, 2000a).

Iron and Steel.—An indefinite general strike, the biggest labor conflict in Norway in 14 years, closed down Fundia AB's steel plant in Mo i Rana and Corus's tinplate plant in Bergen. Fundia is a part of Rautaruukki Group of Finland. Approximately 750 workers from Fundia's reinforcing and structural steel divisions were striking. The reinforcing steel division had a capacity of 2,300 metric tons per day. Steel exports were also being affected. At Corus Packaging Plus in Bergen, 220 of 280 staff were striking. The plant's production capacity was 140,000 t/yr (Metal Bulletin, 2000f).

Fundia might have to cut steel production at its Mo i Rana plant in Norway after the Government of Norway ordered it to reduce mercury emissions from its melting shop using scrap to feed the electric-arc furnace. The Norwegian environmental authorities imposed a maximum level of 80 kilograms per year for mercury emissions. Reinforced steel production at the plant was 700,000 t/yr from a workforce of 800 (Metal Bulletin, 2001).

Finnfjord Smelteverk AS (a subsidiary of the ferrosilicon producer FESIL ASA) renewed its marketing agreement with FESIL Sales AS, which initially would market between 20,000 and 25,000 t/yr of Finnfjord's standard-grade ferrosilicon and eventually all 100,000 t/yr of its tonnage. Elkem also sold the bulk of the Finnfjord material during the last 6 months of 2000. FESIL sold the Finnfjord material to carbon and stainless steel plants in Europe and the United States (Metal Bulletin, 2000c).

Globe Metallurgical Co. of the United States and Gurta AG of Switzerland fought for control of FESIL. Globe held 39.9% of the shares of FESIL. The composite stake held by Tensil, Tennant Nordic, Midgley Group, and Gurta was 41.42%. The liquidity of the shares was further reduced by a 10% stake acquired by Elkem (Metal Bulletin, 2000d). Elkem was the world's largest ferrosilicon producer, while FESIL ranked third. Early in November, Globe withdrew its offer to acquire all outstanding shares of FESIL because its offer failed to attract the 90% acceptance level that was required. FESIL expected to produce 95,000 t/yr of ferrosilicon in high- and semihigh-purity grades and ferrosilicon granules. FESIL's Holla and Rana metalworks were among the lower cost producers in the industry. Demand for ferrosilicon was high owing to active stainless steel production (Metal Bulletin, 2000b).

Nickel.—A 5-day strike by workers at Falconbridge Nickel Mines Ltd.'s Nikkelverk refinery in Kristiansand ended on November 20. No loss of production was suffered. The action was taken in support of workers on strike at the company's Sudbury complex in Canada.

Silicon.—Elkem signed an agreement with AstroPower Inc. to develop a low-cost process to manufacture solar grade silicon in Norway. The market for solar-grade silicon generated around $75 million per year and was expected to grow at a rate of 25% to 30% during the next 5 years.

Elkem sought to expand its silicon business through acquisitions and capacity expansions. A potential target of acquisition in the silicon industry might be FESIL, and expansion of silicon output could be through the conversion of furnaces from ferrosilicon production (Metal Bulletin, 2000a).

FESIL has 60,000 t/yr silicon capacity with five furnaces. Three of them were closed for most of 1999. One 8,500-t/yr furnace at Holla was restarted at yearend 1999 with the two others being restarted in 2000. All five were in full operation by mid-May. Demand for silicon in the chemical sector grew by 5% to 6%, with most demand coming from Europe and Japan.

Mineral Fuels

The seven licensee groups covering the Snohvit, Askeladden, and Albatross gas/condensate fields on the Tromso Patch off northern Norway concluded a unitization agreement. The redistribution of interests in the unitized license gave Statoil 34.29%, and the SDFI, 30%. The unitization would give the licensees a common goal for future work on a Snohvit development based on gas liquefaction. Statoil expected to increase drilling activity by 11%, accounting for 45% of all Norwegian well drilling (World Oil, 2000a).

The startup of Statoil's new Norne-Heidrun gas pipeline system in the Norwegian Sea was postponed until November. Statoil was due to start exporting gas from Norne using a pipeline extending 128 kilometers (km) south to tie into its Asgard transport trunk line. Heidrun gas is linked by a 39-km line into the Asgard trunk line, which extends to the Karsto treatment north of Stavanger. The Norne export line was expected to carry 1 billion cubic meters per year of gas, and the Heidrun part of the system, 75 million cubic meters per year (Oil & Gas Journal, 2000).

Norsk Hydro intended to double its total petroleum production to 800,000 barrels per day (bbl/d) from 400,000 bbl/d by 2010. The company planned to buy part of the SDFI i 150 Norwegian offshore licenses worth $22.8 billion and could face stiff competition from Statoil. Meanwhile, the first production well on Statoil's Sygna field in the Norwegian Nort Sea came on-stream. A second well was due to start up before yearend. Sygna contained an estimated 53.5 billion barrels of recoverable oil (Alexander's Gas & Oil Connections, August 18, 2000, First production well on Statoil's North Sea Sygna field comes on-stream, accessed August 21, 2000, at URL http://www.gasandoil.com/goc/company/cne03328.htm).

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Major Sources of Information

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P.O. Box 3006 Lade
7002 Trondheim, Norway
Royal Ministry of Petroleum and Energy
P.O. Box 8148 Dep
0033 Oslo, Norway

TABLE 1
NORWAY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 e/	2000 e/
METALS						
Aluminum:						
Primary		863,002	918,558	995,619	1,020,215 3/	1,025,676 3/
Secondary		59,702	58,635	62,400	178,313 3/	260,000
Cadmium, smelter		274	290	270 e/	211 3/	298 3/
Cobalt		3,098	3,417	3,851	4,009 3/	3,433 3/
Copper:						
Mine output:						
Concentrate		30,000	28,000	11,000 e/	--	--
Cu content		7,400	6,671	2,698	--	--
Metal, primary and secondary, refined		28,526 r/	32,639	31,658	33,262 3/	27,000
Iron and steel:						
Iron ore and concentrate, Fe content	thousand tons	1,023 r/	462 r/	382 r/	355 r/ 3/	369 3/
Metal:						
Pig iron e/	do.	70	70	70	60	60
Ferroalloys:						
Ferrochromium	do.	109 r/	145 e/	175 r/	160	165
Ferromanganese	do.	215	235 r/	235 r/	235	235
Ferrosilicomanganese e/	do.	210	230 r/	230 r/	230	230
Ferrosilicon (75% basis)	do.	462	470 e/	470 e/	460	460
Silicon metal	do.	110	110 e/	110 e/	100	100
Other e/	do.	15	15	15 e/	15	15
Total e/	do.	1,120 r/	1,210 r/	1,240 r/	1,200	1,210
Steel, crude	do.	511	570 3/	644 3/	611 3/	620
Semimanufactures, rolled e/	do.	300	300	300	300	300
Lead, mine output:						
Concentrate		2,600	2,600	--	--	--
Pb content		2,083 r/	2,000	--	--	--
Magnesium, primary		37,800	34,200	35,400	35,000	35,000
Nickel:						
Mine output:						
Concentrate e/		23,000	20,000	20,000	21,000	18,000
Ni content		3,135	2,454	2,959 r/	2,965 r/ 3/	2,538 3/
Metal, primary		61,582	62,702	70,151	74,137 3/	58,679 3/
Platinum-group metals e/ 4/	kilograms	1,200	1,000	1,000	1,000	1,000
Titanium: e/						
Ilmenite concentrate	thousand tons	747 r/	750	590	580 r/ 3/	610
TiO_2 content	do.	340	340	260	257 r/ 3/	270
Zinc:						
Mine output:						
Concentrate		17,182 r/	15,800 r/	--	--	--
Zn content		8,591 r/	7,900 r/	--	--	--
Metal, primary		134,900	137,400	128,000	132,600 3/	125,800 3/
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	1,664	1,724	1,676	1,700	1,720
Feldspar		76,000	75,000 e/	75,000 e/	72,777 r/ 3/	75,000
Graphite e/		2,600	2,600	2,600	2,500	2,500
Lime, hydrated, quicklime e/	thousand tons	100	100	100	100	100
Mica, flake e/		2,500	2,500	2,500	2,500	2,500
Nepheline syenite	thousand tons	300	300 e/	300 e/	305 r/ 3/	300
Nitrogen, N content of ammonia	do.	295	279	245	122 r/ 3/	334 3/
Olivine sand	do.	3,600	3,600 e/	3,600 e/	3,162 r/ 3/	3,200
Pyrite e/	do.	6 3/	5	5	-- r/ 3/	--
Stone, crushed:						
Dolomite e/	do.	800	800	800	893 r/ 3/	900
Limestone e/	do.	4,600	4,500	4,500	6,915 r/ 3/	7,000
Quartz and quartzite	do.	960	1,000 e/	1,000	1,314 r/ 3/	1,300
Sulfur, byproduct: e/						
Metallurgy	do.	80	80 r/	80	105	100
Petroleum	do.	20	20 r/	18 3/	12	15
Total	do.	100	100 r/	98	117	115
Talc, soapstone, steatite e/	do.	28	28	26	26	27

See footnotes at end of table.

TABLE 1--Continued
NORWAY: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 e/	2000 e/
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	thousand tons	261	260 e/	250	328 r/ 3/	330
Gas, natural, marketed 5/	do.	37,400	42,600 e/	43,600	43,000	42,000
Peat, for agricultural use e/	do.	30	30	30	30	30
Petroleum:						
Crude 6/	thousand 42-gallon barrels	1,104,096	1,105,584	1,100,000 e/	1,100,000	1,000,000
Natural gas liquids e/	do.	41,600	42,000	42,000	42,000	41,000
Refinery products: e/						
Naphtha	do.	26,400 r/	26,000	26,000	26,000	26,000
Gasoline	do.	25,000	25,000	25,000	25,000	26,000
Kerosene	do.	9,000	9,000	9,000	9,000	9,000
Distillate fuel oil	do.	45,000	45,000	45,000	45,000	46,000
Residual fuel oil	do.	12,000	12,000	12,000	12,000	12,000
Other	do.	4,000	4,000	4,000	4,000	4,000
Refinery fuel and losses	do.	4,000	4,000	4,000	4,000	4,000
Total	do.	125,000	125,000	125,000	125,000	127,000

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through July 31, 2001.

2/ Estimated data are rounded to three significant digits; may not add to totals shown.

3/ Reported figure.

4/ Data represent exports.

5/ Reported as total methane sales.

6/ Excluding natural gas liquids.

TABLE 2
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Hydro Aluminium ANS (Norsk Hydro A/S, 70%)	Smelters at Årdal, Hoyanger, Karmoy, and Sunndalsora	600
Do.	Elkem Aluminium (Elkem A/S, 50%; and Alcoa Inc., 50%)	Smelters at Farsund and Mosjoen	250
Do.	Sor-Norge Aluminium A/S (Alusuisse Group, 50%; and Hydro Aluminium, 49%)	Smelter at Odda	50
Cadmium	Norzink A/S (Boliden Mineral AB, 50%; and Rio Tinto plc, 50%)	Smelter at Eitrheimsneset	0.3
Cement	Norcem A/S	Plants at Brevik and Kjopsvik	2,150
Coal	Store Norske Spitsbergen Kulkompani A/S	Mines at Longyearbyen and Svea	450
Cobalt	Nikkelverk A/S (Falconbridge Nickel Mines Ltd., 100%)	Smelter at Kristiansand	3
Copper:			
Ore, Cu content	Grong Guber A/S (Norsulfid A/S, 100%)	Mines at Royrvik and Gjersvik	8
Do.	Nikkel og Olivin A/S (Norsulfid A/S, 100%)	Mine at Narvik	1
Metal	Nikkelverk A/S (Falconbridge Nickel Ltd., 100%)	Smelter at Kristiansand	40
Dolomite	Franzefoss Bruk A/S	Mine at Ballagen	350
Do.	Norwegian Holding A/S	Mines at Hammerfall, Logavlen, and Kvitblikk	500
Feldspar	Franzefoss Bruk A/S	Mine at Lillesand	100
Ferroalloys	Elkem Rana (Elkem A/S, 100%)	Ferrochromium plant at Mo i Rana	140
Do.	Elkem Salten (Elkem A/S, 100%)	Ferrosilicon plant at Straumen	85
Do.	Elkem Bjolvefossen (Elkem A/S, 100%)	Ferrosilicon plant at Alvik	60
Do.	Elkem Thamshavn (Elkem A/S, 100%)	Ferrosilicon plant at Orkanger	60
Do.	Finnfjord Smelteverk AS, Rana Metal (FESIL ASA, 100%)	Ferrosilicon plant at Mo i Rana	140
Do.	A/S Hafslung Metal (FESIL ASA, 100%)	Ferrosilicon plant at Sarpsborg	75
Do.	Ila og Lilleby Smelteverk (FESIL ASA, 100%)	Ferrosilicon plant at Finnsnes	60
Do.	Oye Smelteverk (Tinfos Jernverk A/S, 100%)	Silicomanganese plant at Kvinesdal	235
Iron, metal	Ulstein Jernstoperi A/S	Hordvikneset	10

TABLE 2--Continued
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron ore	Rana Gruber A/S (Norsk Jernverk Holding A/S, 100%)	Mine at Mo i Rana	2,000
Do.	Artic Bulk Minerals A/S	Mine and plant at Kirkenes	1,500
Lead ore, Pb content	A/S Bleikvassli Gruber (A/S Sydvaranger, 100%)	Mine at Bleikvassli	2
Lime	Hylla Kalkverk (Nikolai Bruch A/S, 100%)	Verdal/Trondheim Mine and plant	80
Do.	A/S Norsk Jernverk	Plant at Mo i Rana	48
Do.	Ardal og Sunndal Verk A/S	More og Romsdal Mine at Surnadal	20
Do.	Breivik Kalkverk A/S	Alesund Mine at Larsnes	20
Do.	Mjoendalen Kalkfabrik	Plant at Asen/Drammen	7
Limestone	Norcem A/S	Dalen, Bjorntvedt, and Kjopsvik Mines	1,600
Do.	Vardelskalk A/S (Franzefoss Burk A/S, 100%)	Sandvika Mine	800
Do.	Breivik Kalkverk A/S	Visnes and Glaerum Mines	500
Magnesium	Norsk Hydro A/S (Government, 51%)	Plants at Porsgrunn and Sauda	50
Manganese, alloys	Eramet SA	do.	500
Natural gas million cubic meters	Den Norske Stats Oljeselskap A/S	Gama, Gullfaks, Sleipner Ost, and Statfjord Fields	12,270
Do.	Phillips Petroleum Company Norway	Ekofisk Field	9,900
Do.	Elf Petroleum Norge A/S	Frigg, Heimdal, and Ost-Frigg Fields	5,750
Do.	Norsk Hydro Produksjon A/S	Troll-Oseberg Field	2,600
Do.	BP Petroleum Development of Norway	Gyda and Ula Fields	1,040
Do.	Esso Norge A/S	Odin Field	1,000
Do.	Amoco Norway A/S	Hod and Valhall Fields	910
Nepheline syenite	North Cape Mineral A/S (Unimin Corp., 84%)	Mine at Stjernoy	350
Nickel:			
Ore, Ni content	Nikkel og Olivin A/S (Norsulfid A/S, 100%)	Mine at Narvik	3
Do.	Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	0.5
Metal	Nikkelverk A/S (Falconbridge Nickel Mines Ltd., 100%)	Smelter at Kristiansand	85
Olivine	A/S Olivin	Åheim Mine and plant	2,500
Do.	do.	Stranda Mine and plant	300
Do.	Franzefoss Bruk A/S	Lefdal Mine at Bryggja	500
Petroleum barrels per day	Den Norske Stats Oljeselskap A/S	Gullfaks, Statfjord, Tommeliten, and Veslefrikk Fields	1,069,300
Do.	Norsk Hydro Produksjon A/S	Brage, Mime, and Oseberg Fields	566,200
Do.	Phillips Petroleum Company Norway	Ekofisk Field	237,500
Do.	Saga Petroleum A/S	Snorre Field	170,000
Do.	BP Petroleum Development of Norway	Gyda and Ula Fields	155,000
Do.	A/S Norske Shell	Draugen Field	90,000
Pyrite	Folldal Verk A/S (Norsulfid A/S, 100%)	Mine at Hjerkinn	10
Quartzite	Elkem Tana (Elkem A/S, 100%)	Mine at Tana	540
Do.	Elkem Marnes (Elkem A/S, 100%)	Mine at Sandhornoy	200
Do.	Vatnet Kvarts A/S	Mine at Nordland	150
Do.	Snekkevik Kvartsbrudd	Mine at Kragero	110
Silicon metal	Lilleby Metall A/S (FESIL ASA, 100%)	Plant at Trondheim	9
Steel	Fundia AB (Norsk Jenverk, 50%; and Rautaruukki Group, 50%)	Plants at Christiania, Spigerverk, Mandal Stal, and Mo i Rana	600
Talc	A/S Norwegian Talc (Pluess-Staufer AG, 51%)	Mine/plant at Altermark/Knarrevik and Framfjord	90
Do.	Kvam Minerals A/S	Mine/plant at Kvam	6
Titanium, concentrate	Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	800
Zinc:			
Ore, Zn content	A/S Bleikvassli Gruber (A/S Sydvaranger, 100%)	Mine at Bleikvassli	10
Metal	Norzik A/S (Boliden Mineral AB, 50%; and Rio Tinto plc, 50%)	Smelter at Odda	137

THE MINERAL INDUSTRY OF

PORTUGAL

By Harold R. Newman

The southern Iberian Peninsula, known as the Iberian Pyrite Belt (IPB), is one of the most mineralized areas of Western Europe and is geologically very complex. Massive sulfides linked to synorogenic volcanism in the southwestern part of the peninsula are well-known internationally. The metallogenic province stretches about 250 kilometers (km) from Seville, Spain, to the southwestern coast of Portugal.

The IPB's volcanogenic massive sulfide (VMS) deposits, which date to the Upper Devonian and the Lower Carboniferous ages, were deposited during submarine felsic volcanism. Clusters of deposits occur around individual volcanic centers, the ore lying in zones within volcanic and sedimentary host-rock sequences. Typically, these are overlain by a continental flysch group that can be up to 5 km thick. The largest individual deposit located to date was estimated to have held an original resource of about 500 million metric tons (Mt), which was a significant proportion of the 1,725 Mt total resource estimated for the IPB as a whole based on the 90 or so known sulfide deposits. Allowing for previous production, sulfide deposit resources in 1999 (the latest year for which data are available) were estimated to be about 1,100 Mt (Mining Journal, 1999).

In 2000, the mineral industry of Portugal was modest by world standards; its growth rate during the past few years, however, has made minerals one of the country's dynamic industrial sectors. This was mainly because of the discovery and development of the rich copper and tin deposits of Sociedade Mineira de Neves-Corvo S.A. (Somincor) at Neves-Corvo. Although Portugal was the largest producer of mined copper in the European Union (EU) in 2000, labor problems resulted in a decline of production from the previous year (table 1).

The Government continued with the country's privatization program and was proceeding with legislation that would privatize many public companies. The privatization issue was part of a broader program to reduce the role of the state and to restructure the Portuguese economy to one that is more market driven.

Portugal's economic growth during the last decade has been accompanied by a heavy investment in infrastructure improvements largely funded by the EU. From 1987 to 1999, Portugal received net financial flows from the EU of about $27 billion (€29 billion). As a result, the country has made a number of major infrastructure improvements, most notably a system of modern highways. A new international airport and an upgrade of the country's rail system also were planned (U.S. Embassy, Lisbon, Portugal, 2000). Table 2 lists selected indices of industrial production.

Commodity Review

Metals

The Neves-Corvo Mine of Somincor and the Panasqueira tungsten mine of Avocet Mining plc were the two major operations in the metals mining sector. Pirites Alentejanas S.A.R.L. was the country's largest producer of pyrite. Siderúrgia Nacional S.A.R.L. produced iron and steel. Cimentos de Portugal S.A. (Cimpor), which was an important producer of cement, was one of the companies included in the Government's privatization plans. With the exception of copper, dimension stone, ferroalloys, tin, and tungsten, which were of international importance, production of other minerals and related materials had only domestic significance. Most of the large mineral-related companies were owned or controlled by the Government, although some operations were privately owned (table 3).

Tables 4 and 5 list Portugese exports/reexports and imports of selected mineral commodities in 1998 (the latest year for which data are available).

Somincor was 51% Government-owned through the mining conglomerate Empresa de Desenvolvimento Mineiro (EDM). The minority partner was Rio Tinto Ltd. of the United Kingdom, which owned 49% of the joint venture. Somincor's underground mine, which used a drift-and-fill mining method, was designed to produce 1.5 million metric tons per year (Mt/yr) of raw ore that yielded a concentrate that averaged 26% copper content. A conventional drilling, blasting, and mucking cycle was used. Primary crushing of ore was underground, and the ore was moved by a conveyor to a vertical shaft, where it was hoisted to the surface for secondary crushing and treatment. The life of the mine, which was based on estimated proven reserves, was expected to be 20 years (Richards and others, 1991).

Rio Tinto informed the Portugese Government that it was selling its 49% interest in Somincor and had initiated a search for prospective candidates. Noranda Corp. of Canada and Outokumpu Oyi of Finland were two possibilities. Rio Tinto said the decision reflects its increasing focus on larger scale open pit copper operations. EDM was also prepared to sell part of its share but would retain 25% to 30% equity interest in Somincor (Metal Bulletin, 2000).

The Jales-Tres Minas District was probably the most important gold district in Portugal. The area includes the ancient Jales Mine and is 150 km east of Oporto. By the end of its operation, the Jales Mine had produced more than 25 metric tons (t) of gold and more than 100 t of silver and had reached a depth of 600 meters (m) (Neiva and others, 1989).

Gold exploration activities were continuing at Jales-Tres Minas. The joint venture of Sociedade des Mines du Bourneix and EDM reevaluated some of the old deposits that had not been worked since the 1980s.

The Portuguese iron and steel operation was nationalized in 1975 to function as a public entity incorporated as Siderúrgia Nacional Empresa de Productos Planos (SN-Planos). In 2000, the Government changed SN-Planos into a public limited company as a major step toward privatization.

Avocet's Panasqueira Mine was one of the world's largest producers of tungsten concentrates outside of China. Avocet commissioned a new subvertical shaft that accessed 4.7 Mt of estimated ore resources with an in situ grade of 0.33% tungsten oxide (WO_3), given an estimated 10-year life at current (2000) extraction rates. Avocet was undertaking a program to develop these WO_3 resources to a mining reserve category with the possibility of expanding production (Avocet Mining plc, 2000, Tungsten mining, accessed March 26, 2001, at URL http://www.avocet.co.uk/mining/tungstenmining.htm).

EuroZinc Mining Corp. was formed in early 1999 by the amalgamation of Auspex Mining Ltd., EDM, and International Vestor Resources Ltd. EuroZinc was encouraged by the results of a prefeasibility study that confirmed their expectation that on the basis of developing a new deposit, the Aljustrel mine/mill complex could be brought into production relatively quickly as a low-cost zinc producer. The Aljustrel project encompassed five massive sulfide deposits—the Feitas, the Moinho, the Estação, the Gavião, and the Algares. These are typically zoned VMS deposits with lead, silver, and zinc zones at the top and with copper zones at the bottom and are often separated by tens of meters of low-grade pyrite (EuroZinc Mining Corp., March 2000, Current projects, accessed March 27, 2001, at URL http://www.eurozinc.com/s/CurrentProjects.asp?PropertyInfID=543)

The Feitais deposit was the most significant deposit in the Aljustrel Project area owing to its high zinc content, large tonnage, and existing infrastructure. It has extensive underground development in place. The deposit has a known strike length of 700 m; a projected strike length, based on gravity data, of 1,200 m; an average width of about 400 m; and an average thickness of about 60 m. The estimated proven and probable minable reserves were 12 Mt of zinc ore with an average grade of 5.67% zinc, an average grade of 1.7% lead, and an average grade of 64 grams per ton (g/t) silver. Proven and probable minable reserves were estimated to be 1.6 Mt of copper ore with an average grade of 2.2% copper, 0.97% zinc and 14 g/t silver (EuroZinc Mining Corp., March 2000, Current projects, accessed March 27, 2001, at URL http:// www.eurozinc.com/s/CurrentProjects.asp?PropertyInfoID=539).

Industrial Minerals

Portugal's industrial minerals sector was a modern and efficient producer of a variety of materials, most notably dimension stone and minerals for the manufacture of ceramics. The dimension stone industry continued to be an important segment of the mining industry in terms of value and trade.

Several international groups were interested in acquiring a stake in Portugal's largest cement producer Cimentos de Portugal S.A. (Cimpor). The Government was preparing to sell its 12.5% stake. Cimpor stated that it anticipated foreign acquisitions to increase output to between 25 and 30 Mt/yr in 4 years. Holderbank Group of Switzerland, Lafarge Group of France, and SECIL S.A. of Portugal were among the companies that had expressed interest in Cimpor (Wise, 2000). Demand for cement continued because the building and construction industry maintained a high level of activity. This situation was expected to continue to develop Portugal's infrastructure with the substantial volume of work in coming years.

Marble was the most valuable of the stone products and accounted for the majority of stone production. The main area for marble mining continued to be the Evora District.

Mineral Fuels

Since the closure of Empresa Carbonifera de Douro S.A.R.L.'s Germunde Mine at Castello de Pavia in 1997, most coal was imported. The mine closed because of high production costs and difficult mining conditions.

Petroleos de Portugal (Petrogal) embarked on an ambitious plan to reposition itself as a multinational energy firm. The Government established a new energy holding company Galp Petroleos e Gas de Portugal, which included Petrogal and Gas de Portugal (GDP). The arrival of natural gas though a new gas pipeline linking Algeria with Portugal and Spain has led to a massive increase in gas sales. GDP controls the gas pipeline company Transgas S.A. Petrogal itself has set basic targets—to develop its own production of hydrocarbons, to expand and upgrade its refineries to meet EU standards, to consolidate the distribution of petroleum products within the Iberian peninsula, to expand its cogeneration business, and to develop its chemicals business, namely aromatics. Petrogal was planning to invest about $1 billion during the next 3 years on environmental measures and to improve efficiency of its downstream operations (Oil & Gas Journal, 2000).

Outlook

The present structure of the mineral industry could change in the near future because of significant mining exploration by several foreign companies. Copper, gold, kaolin, lead, lithium, pyrites, and tin were some of the minerals targeted for exploration. The IPB is the prime area for exploration activity and would appear to have an above-average potential for success based on an unusually high number of large VMS deposits.

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TABLE 1
PORTUGAL: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Arsenic, white e/		100	50	50	50	50
Beryl concentrate, gross weight e/		4	5	5	4	4
Copper, mine output, Cu content		107,773	106,479	114,637	99,459 r/	76,200 3/
Iron and steel:						
Iron ore and concentrate:						
Gross weight, manganiferous		18,620	18,905	18,000 e/	16,000 e/	15,000
Fe content, manganiferous		7,876	6,800	6,800 e/	11,733 r/	11,800
Metal:						
Pig iron	thousand tons	421	431	385	389	382 3/
Steel, crude	do.	871	905	936 r/	1,038 r/	1,097 3/
Lead, refined, secondary e/		5,900	6,000	6,500	6,000	6,000
Manganese, Mn content of iron ore e/		500	500	500	500	500
Silver, mine output, Ag content	kilograms	33,700	33,900	31,900	26,450 r/	20,430 3/
Tin:						
Mine output, Sn content		4,637	2,667	3,000 e/	2,163 r/	1,227 3/
Metal, primary and secondary e/		100	100	100	100	50
Tungsten, mine output, W content		776	1,036	831	434	743 3/
Uranium concentrate, U_3O_8		17	18	16	12	16 3/
Zinc, smelter, primary e/		3,600	3,600	3,600	4,000	3,600
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	8,455	9,395	9,500 e/	9,400 e/	9,200
Clays:						
Kaolin 4/		177,423	180,000	180,000 e/	221,296 r/	127,581 3/
Refractory e/		392,148 3/	300,000	300,000	521,602 r/	500,000
Diatomite e/		1,550	1,540	1,600	785 r/	686 3/
Feldspar		98,596	121,380	120,000 e/	114,685 r/	119,837 3/
Gypsum and anhydrite e/		520,722 3/	500,000	500,000	550,000	500,000
Lime, hydrated and quicklime e/		200,000	200,000	200,000	200,000	200,000
Lithium minerals, lepidolite		7,626	6,883	8,000	14,862 r/	9,352 3/
Nitrogen, N content of ammonia		197,600	195,600	204,400	223,200	246 3/
Pyrite and pyrrhotite (including cuprous), gross weight e/		10,000	10,000	10,000	10,000	10,000
Salt, rock		609,639	596,000	600,000 e/	558,807 r/	584,516 3/
Sand e/		5,127 3/	5,000	4,000 r/	3,664 3/	4,000
Sodium compounds, n.e.s.: e/						
Soda ash		150,000	150,000	150,000	150,000	150,000
Sulfate		50,000	50,000	50,000	50,000	50,000
Stone: e/						
Basalt	thousand tons	100	100	100	520,262 r/	500,000
Calcareous:	do.					
Dolomite	do.	510	500	500	500	500
Limestone, marl, calcite	do.	35,370 3/	15,000	15,000	35,580 3/	35,000
Marble	do.	945	900	900	1,215 3/	900
Diorite	do.	282	1,000	1,000	17,649 3/	1,700
Gabbro	do.	147	100	100	100	100
Granite, crushed	do.	18,412 3/	24,057 3/	25,000	22,400 3/	20,000
Granite, ornamental	do.	400	400	500	458 3/	500
Graywacke	do.	60	20	22	20	20
Ophite	do.	25	9	5	3	5
Quartz	do.	14	14	15	15	38 3/
Quartzite	do.	594	500	500	573 3/	600
Schist	do.	260	100	100	136 3/	140
Slate	do.	20	30	40	46 3/	40
Syenite	do.	27	86	80	80	80
Sulfur: e/						
Content of pyrites		5,000	5,000	5,000	--	--
Byproduct, all sources		30,000	30,000	30,000	32,000	30,000
Total		35,000	35,000	35,000	32,000	30,000
Talc		8,277	8,236	8,400	9,554 r/	7,407 3/

See footnotes at end of table.

TABLE 1--Continued
PORTUGAL: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
MINERAL FUELS AND RELATED MATERIALS						
Coke, metallurgical e/	thousand tons	332 3/	330	330	325	325
Gas, manufactured e/	million cubic meters	125	125	125	125	125
Petroleum refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	4,338	4,500	4,500 e/	4,500 e/	4,500
Gasoline	do.	21,828	15,000	15,000 e/	15,000 e/	15,000
Jet fuel	do.	7,500	7,000	7,000 e/	7,000 e/	7,000
Kerosene	do.	400	225	225 e/	225 e/	225
Distillate fuel oil	do.	20,000	20,000	20,000 e/	20,000 e/	20,000
Residual fuel oil	do.	20,000	20,000	20,000 e/	20,000 e/	20,000
All other products	do.	9,000	10,000	10,000 e/	10,000 e/	10,000
Refinery fuel and losses	do.	3,500	3,000	3,000 e/	3,000 e/	3,000
Total	do.	86,566	79,725 r/	79,700 r/ e/	79,700 r/ e/	79,700

e/ Estimated. r/ Revised.

1/ Table includes data available through March 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reported figure.

4/ Includes washed and unwashed kaolin.

TABLE 2
PORTUGAL: SELECTED INDICES OF PRODUCTION

(1990=100)

Sector	1997	1998	1999	2000 e/
General	103	113	117	120
Mining	86	92	90	95
Manufacturing	102	108	110	112
Electricity and gas	113	146	169	170

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no. 12, December, p. 30.

TABLE 3
PORTUGAL: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of facilities	Annual capacity
Cement		Cimentos de Portugal S.A. (Government, 100%)	10 plants, various locations	6,000
Copper concentrate		Sociedade Mineira de Neves-Corvo S.A. (Somincor) (Government, 51%; Rio Tinto Ltd., 49%)	Neves-Corvo Mine near Castro Verde	500
Diatomite		Sociedade Anglo-Portugesa de Diatomite Lda.	Mines at Obidos and Rolica	5
Feldspar		A.J. da Fonseca Lda.	Seixigal Quarry, Chaves	10
Ferroalloys		Electrometalúrgia S.A.R.L.	Plant at Setubal	100
Petroleum, refined	barrels per day	Petroleos de Portugal (Government, 100%)	Refineries at Lisbon, Porto, and Sines	300,000
Pyrite		Pirites Alentejanas S.A.R.L.	Plant at Setubal	100
Steel, crude		Siderurgia Nacional S.A.R.L. (Government, 100%)	Ironworks and steelworks at Seixal and Maia	1,000
Tin		Somincor (Government, 51%; Rio Tinto Ltd., 49%)	Neves-Corvo Mine near Castro Verde	5
Tungsten		Avocet Mining plc	Panasqueira Mine and plant at Barroca Grande	1,600
Uranium	tons	Empresa Nacional de Uranio S.A. (Government, 100%)	Mines at Guargia, plant at Urgeirica	150
Zinc, refined		Quimigal E.P. (Government, 100%)	Electrolytic plant at Barreiro	11

TABLE 4
PORTUGAL: EXPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

Commodity	Total	Destinations: United States	Destinations: Other (principal)
METALS			
Aluminum:			
Oxides and hydroxides	24	--	Thailand 20; Denmark 3.
Ash and residue	272	--	All to Spain.
Metal including alloys:			
Scrap	12,349	--	Spain 12,084; Hong Kong, China 82; Netherlands 56.
Unwrought	34,213	--	Spain 31,943; France 2,186; Germany 80.
Semimanufactures	7,703	(2/)	Spain 2,798; France 2,515; United Kingdom 810.
Antimony, metal including alloys, all forms value, thousands	$3	--	Brazil $1; Spain $1.
Bismuth, metal including alloys, all forms do.	$1	--	All to Latvia.
Copper:			
Ore and concentrate	447,370	--	Germany 128,186; Finland 120,854; Spain 101,772.
Sulfate	3	--	All to Sao Tome and Principe.
Metal including alloys:			
Scrap	9,892	--	Spain 9,125; Belgium-Luxembourg 249; Netherlands 233.
Unwrought value, thousands	$2,209	--	Germany $1,321; United Kingdom $641; Spain $215.
Semimanufactures	3,203	1	United Kingdom 1,109; Spain 912; France 514.
Gold:			
Waste and sweepings value, thousands	$436	--	All to Spain.
Metal including alloys, unwrought and partly wrought do.	$8,385	$13	Italy $4,675; Spain $3,684; Gabon $5.
Iron and steel:			
Ore and concentrate, including roasted pyrite	5,500	--	All to Morocco.
Metal:			
Scrap	121,427	32	Spain 118,986; Hong Kong, China 2,195; Angola 117.
Pig iron, cast iron, related materials	3,006	--	Spain 2,937; Morocco 46; Benin 20.
Ferroalloys:			
Ferrochromium	4	--	All to Morocco.
Ferromanganese	27	--	Spain 14; Morocco 13.
Ferrosilicon	218	--	Spain 215; Morocco 2; Mozambique 1.
Unspecified	1	--	All to Spain.
Steel, primary forms	88,366	20,062	Spain 34,154; Morocco 14,995; Netherlands 10,050.
Semimanufactures:			
Flat-rolled products:			
Of iron or nonalloy steel:			
Not clad, plated, coated	17,412	--	Spain 14,183; Angola 2,420; Cape Verde 267.
Clad, plated, coated	163,153	13,819	Spain 100,728; Italy 13,094; Canada 6,634.
Of alloy steel	5,662	3	Ireland 3,208; Spain 1,688; United Kingdom 271.
Bars, rods, angles, shapes, sections	176,378	532	Spain 141,648; Germany 15,919; United Kingdom 6,367.
Rails and accessories	157	--	India 33; Mozambique 33; Argentina 31.
Wire	21,375	549	Spain 18,888; Angola 775; United Kingdom 487.
Tubes, pipes, fittings	53,015	142	Spain 46,363; Angola 2,326; Cape Verde 1,090.
Lead:			
Oxides	3,217	417	Spain 2,466; Italy 217; Netherlands 51.
Metal including alloys:			
Scrap	1,542	--	All to Spain.
Unwrought	5	--	Do.
Semimanufactures	114	--	Spain 86; France 18; Angola 8.
Magnesium, metal including alloys:			
Scrap value, thousands	$255	--	Norway $252; Singapore $2.
Unwrought	61	--	All to Norway.
Manganese, oxides value, thousands	$1	--	All to Greece.
Mercury	3	--	All to Morocco.
Molybdenum, metal including alloys:			
Unwrought value, thousands	$11	--	All to Brazil.
Semimanufactures do.	$5	--	Do.
Nickel, metal including alloys:			
Scrap	28	--	All to Spain.
Semimanufactures	3	(2/)	United Kingdom 2.
Rare-earth, metals including alloys, all forms	20	--	All to Angola.
Silicon, high-purity	15	--	All to Spain.

See footnotes at end of table.

TABLE 4-Continued
PORTUGAL: EXPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

			Destinations	
Commodity		Total	United States	Other (principal)
METALS--Continued				
Silver, metal including alloys, unwrought and partly wrought	value, thousands	$86		Spain $67; Germany $14; Angola $2.
Tin:				
Ore and concentrate		6,257	--	Malaysia 3,179; Thailand 2,802; Turkmenistan 255.
Metal including alloys:				
Scrap		19	--	Netherlands 18; United Kingdom 1.
Semimanufactures	value, thousands	$8	--	Spain $3; Angola $2; Cape Verde $1.
Titanium:				
Oxides		101	--	Angola 37; Cape Verde 24; Spain 21.
Metal including alloys, all forms	value, thousands	$50	$49	Spain $1.
Tungsten:				
Ore and concentrate		1,269	1,209	Japan 60.
Metal including alloys:				
Unwrought		22	--	All to Brazil.
Semimanufactures	value, thousands	$106	--	Israel $63; Romania $19; Japan $18.
Uranium and thorium, ore and concentrate	do.	$2,093	--	All to United Kingdom.
Zinc:				
Oxides		6,985	--	Spain 4,365; France 877; Italy 536.
Ash and residue		96	--	All to Spain.
Metal including alloys:				
Scrap		2,380	--	Spain 2,218; Germany 162.
Unwrought		128	--	Spain 101; unspecified 27.
Semimanufactures		780	--	Angola 418; Spain 129; Sao Tome and Principe 103.
Other:				
Oxides and hydroxides		13,532	--	South Africa 13,006; Angola 526.
Precious metals, n.e.s., waste and scrap	value, thousands	$131	--	All to Spain.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural, corundum, emery, pumice, etc.	do.	$46	--	Spain $43; Angola $3.
Artificial, silicon carbide		33	--	All to Spain.
Dust and powder of precious and semiprecious stones including diamonds	value, thousands	$88	--	Cuba $83; Greenland $5.
Grinding and polishing wheels and stones		957	(2/)	Spain 609; Italy 169; Angola 32.
Barite and witherite		23	--	All to France.
Boron:				
Crude natural borates	value, thousands	$1	--	All to Mozambique.
Oxides and acids		41	--	Spain 24; Angola 17.
Cement		34,990	--	Cape Verde 22,429; Sao Tome and Principe 6,069; Guinea-Bissau 2,712.
Chalk		5,046	--	Spain 2,646; Brazil 1,230; Chile 572.
Clays, crude:				
Bentonite		671	--	Spain 610; Venezuela 40; Angola 21.
Chamotte earth and dinas earth		543	--	Morocco 473; Tunisia 48; Syria 22.
Fire clay		2,492	--	All to Spain.
Kaolin		2,741	--	Spain 1,821; Paraguay 449; Argentina 340.
Other		1	--	All to France.
Diamond, natural:				
Gem, not set or strung	value, thousands	$62,290	$3,707	United Kingdom $42,836; Belgium-Luxembourg $15,653; Germany $70.
Dust and powder	do.	$88	--	Cuba $83; Greenland $5.
Diatomite and other infusorial earth		4	--	All to Angola.
Feldspar		2,060	--	France 1,983; Spain 52; Italy 25.
Fertilizer materials, manufactured:				
Ammonia		25,122	--	Spain 18,515; Norway 6,603; Cape Verde 2.
Nitrogenous		132,561	--	Spain 87,426; Germany 28,987; Netherlands 5,989.
Phosphatic		41,725	--	Spain 28,158; Brazil 10,520; France 2,550.
Potassic	value, thousands	$67	--	Cote d'Ivoire $66; Cape Verde $1.
Unspecified and mixed		14,893	--	Spain 141,165; Cote d'Ivoire 2,666; Angola 23.
Fluorspar		2	--	All to Morocco.

See footnotes at end of table.

TABLE 4--Continued
PORTUGAL: EXPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

		Destinations	
Commodity	Total	United States	Other (principal)
INDUSTRIAL MINERALS--Continued			
Gypsum and plaster	471	--	Cape Verde 248; Angola 171; Iceland 26.
Iodine value, thousands	$2	--	Angola $1; Cape Verde $1.
Lime	4,084	--	Spain 2,250; Angola 1,548; Cape Verde 151.
Magnesium compounds, oxides and hydroxides	10	--	Norway 9; Mexico 1.
Mica:			
Crude including splittings and waste	4	--	Angola 3; Morocco 1.
Worked including agglomerated splittings value, thousands	$3	--	Angola $1; Mozambique $1; Netherlands $1.
Pigments, mineral, iron oxides and hydroxides, processed	74	--	Spain 39; Angola 21; Guinea-Bissau 9.
Precious and semiprecious stones other than diamond, natural value, thousands	$90	--	Switzerland $55; Germany $34.
Quartz crystal, piezoelectric do.	$8	--	All to France.
Salt and brine	13,048	274	Nigeria 6,755; Liberia 2,428; Germany 1,913.
Sodium compounds, n.e.s., soda ash, manufactured	3,967	--	Spain 3,550; France 282; Angola 115.
Stone, sand and gravel:			
Dimension stone:			
Crude and partly worked	477,257	876	Germany 139,449; Spain 136,421; France 41,288.
Worked	595,612	15,903	Germany 215,058; France 39,459; Denmark 35,826.
Dolomite, chiefly refractory-grade	7,477	--	Norway 7,475; Spain 2.
Gravel and crushed rock	12,383	--	France 6,354; Lebanon 3,006; Spain 2,191.
Limestone other than dimension	4	--	All to Angola.
Quartz and quartzite	40,557	--	Norway 39,095; Ireland 565; France 432.
Sand other than metal-bearing	96,869	--	Italy 59,866; Spain 33,682; Israel 1,677.
Sulfur:			
Elemental:			
Crude including native and byproduct	11,342	--	Lebanon 6,898; Slovenia 3,062; Spain 1,116.
Colloidal, precipitated, sublimed	8	--	Angola 6; Spain 2.
Sulfuric acid	213	--	Angola 135; Cape Verde 58; Congo (Kinshsa) 13.
Talc, steatite, soapstone, pyrophyllite	76	--	Angola 34; Saudi Arabia 20; Spain 15.
Other:			
Crude	4,071	--	Spain 4,065; Angola 3; Italy 2.
Slag and dross, not metal-bearing, granulated slag (slag sand) from iron and steel industry	19,995	--	All to Spain.
MINERAL FUELS AND RELATED MATERIALS			
Asphalt and bitumen, natural	19,638	--	Spain 19,521; Sao Tome and Principe 49; France 24.
Carbon black	22,938	--	Spain 19,826; Germany 1,055; Netherlands 684.
Coal, bituminous	8	--	All to Spain.
Coke and semicoke	83,840	--	Spain 31,958; Tunisia 27,797; Italy 13,242.
Petroleum:			
Crude 42-gallon barrels	80	--	All to Cape Verde.
Refinery products:			
Liquefied petroleum gas do.	678,878	--	Spain 300,800; Belgium-Luxembourg 275,407; Morocco 72,651.
Mineral jelly and wax do.	18,369	(2/)	Italy 9,035; Spain 8,988; Angola 134.
Asphalt do.	309,236	--	Spain 308,278; Sao Tome and Principe 951.
Bituminous mixtures do.	14,326	--	Cape Verde 6,557; Spain 5,133; Cuba 1,376.
Petroleum coke do.	154	--	All to Spain.
Unspecified thousand 42-gallon barrels	16,237	5,365	United Kingdom 1,279; Spain 1,229; unspecified 4,669.

1/ Table prepared by Glenn J. Wallace, International Data Unit.
2/ Less than 1/2 unit.

Source: United Nations Statistical Office (microfiche).

TABLE 5
PORTUGAL: IMPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

			Sources	
Commodity		Total	United States	Other (principal)
METALS				
Alkali and alkaline-earth metals:				
Alkali metals	value, thousands	$27	--	Germany $13; Netherlands $8; United Kingdom $5.
Alkaline-earth metals		39	--	Germany 24; Spain 14.
Aluminum:				
Ore and concentrate		2,008	--	Spain 1,654; France 265; Netherlands 89.
Oxides and hydroxides		8,687	63	Spain 5,570; France 2,192; Germany 383.
Metal including alloys:				
Scrap		944	--	Spain 628; Israel 280; Russia 23.
Unwrought		109,175	12	Norway 57,978; Spain 27,679; Netherlands 7,763.
Semimanufactures		40,490	102	Spain 11,327; Germany 10,852; France 4,897.
Antimony:				
Oxides		235	--	China 75; Spain 64; United Kingdom 29.
Metal including alloys, all forms		24	--	Spain 20; Netherlands 3; Belgium-Luxembourg 1.
Arsenic, metal including alloys, all forms		25	--	All from Spain.
Beryllium, metal including alloys, all forms	value, thousands	$5	$4	Italy $1.
Bismuth, metal including alloys, all forms		2	--	Belgium-Luxembourg 1; Spain 1.
Cadmium, metal including alloys, all forms	value, thousands	$1	--	All from unspecified Europe.
Chromium:				
Ore and concentrate		1,947	--	South Africa 924; Spain 527; Netherlands 496.
Oxides and hydroxides		185	--	Spain 102; Germany 52; Netherlands 20.
Metal including alloys, all forms		5	1	Germany 4.
Cobalt:				
Ore and concentrate	value, thousands	$67	--	France $31; Italy $27; Spain $9.
Oxides and hydroxides		8	--	Belgium-Luxembourg 4; United Kingdom 2; Finland 1.
Metal including alloys, all forms		32	--	Belgium-Luxembourg 12; France 12; Germany 6.
Copper:				
Oxides and hydroxides		242	--	Norway 160; Germany 80; Spain 2.
Sulfate		2,799	--	Spain 1,395; France 659; Italy 522.
Ash and residue		22	--	All from Netherlands.
Metal including alloys:				
Scrap		2,282	35	Spain 720; United Kingdom 411; South Africa 241.
Unwrought		2,532	9	Spain 1,564; Turkey 363; Germany 304.
Semimanufactures		76,929	117	Spain 35,423; Italy 9,298; France 8,882.
Gold:				
Waste and sweepings	value, thousands	$14	--	All from United Kingdom.
Metal including alloys, unwrought and partly wrought	do.	$61,805	$362	Germany $31,425; Spain $20,061; France $4,936.
Iron and steel:				
Ore and concentrate, excluding roast pyrite		590,097	--	Brazil 399,263; Canada 190,477; Netherlands 300.
Metal:				
Scrap		173,556	655	United Kingdom 120,497; Germany 17,270; Netherlands 7,995.
Pig iron, cast iron, related materials		38,466	81	Russia 20,912; Spain 6,956; Germany 3,316.
Ferroalloys:				
Ferrochromium		1,037	--	Spain 306; Germany 289; Belgium-Luxembourg 251.
Ferromanganese		1,304	--	Spain 1,099; Germany 103; France 77.
Ferromolybdenum		111	--	Austria 69; Spain 28; Germany 10.
Ferroniobium		4	--	Germany 3; Spain 1.
Ferrosilicomanganese		6,304	--	All from Spain.
Ferrosilicon		4,360	--	Spain 2,511; Norway 643; Brazil 579.
Ferrotitanium and ferrosilicotitanium		9	--	United Kingdom 6; Germany 2; Spain 1.
Ferrotungsten and ferrosilicotungsten	value, thousands	$2	--	All from Germany.
Ferrovanadium	do.	$15	--	Spain $14; Germany $1.
Silicon metal		31	--	Spain 30; Argentina 1.
Unspecified		3,342	--	Spain 2,972; France 321; Argentina 39.
Steel, primary forms		22,860	450	Germany 5,060; Brazil 1,714; Spain 1,418.
Semimanufactures:				
Flat-rolled products:				
Of iron or nonalloy steel:				
Not clad, plated, coated		971,799	282	Netherlands 151,803; Germany 107,586; Spain 97,959.
Clad, plated, coated		270,167	578	Spain 51,866; Germany 38,131; Italy 37,413.
Of alloy steel		110,994	--	Germany 32,084; France 30,472; Spain 22,810.

See footnotes at end of table.

TABLE 5--Continued
PORTUGAL: IMPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

Commodity		Total	Sources	
			United States	Other (principal)
METALS--Continued				
Iron and steel--Continued:				
Metal--Continued:				
Semimanufactures--Continued:				
Bars, rods, angles, shapes, sections		795,893	620	Spain 427,118; Italy 57,441; Belgium-Luxembourg 54,557.
Rails and accessories		33,839	--	France 16,826; Spain 10,856; Italy 2,963.
Wire		41,669	26	Spain 15,686; Belgium-Luxembourg 5,432; South Africa 5,304.
Tubes, pipes, fittings		178,978	44	Spain 85,269; France 37,897; Germany 22,827.
Lead:				
Ore and concentrate		14	--	All from United Kingdom.
Oxides		830	19	Spain 811.
Metal including alloys:				
Scrap		8	--	All from Spain.
Unwrought		28,072	--	Morocco 12,084; Bulgaria 5,425; United Kingdom 1,974.
Semimanufactures		348	--	Spain 94; Greece 83; France 77.
Lithium oxides and hydroxides	value, thousands	$2	--	Sweden $1; United Kingdom $1.
Magnesium, metal including alloys:				
Unwrought		383	--	Norway 363; France 16; Italy 2.
Semimanufactures	value, thousands	$52	$36	Germany $6; Switzerland $5; United Kingdom $3.
Manganese:				
Ore and concentrate		524	--	Netherlands 280; Greece 194; Spain 50.
Oxides		358	--	South Africa 220; Spain 87; Germany 30.
Metal including alloys, all forms		29	--	Germany 21; Italy 4; Netherlands 4.
Mercury	value, thousands	$30	--	Germany $25; Spain $4; France $1.
Molybdenum:				
Oxides and hydroxides	do.	$3	$3	
Metal including alloys:				
Unwrought		9	1	Germany 8.
Semimanufactures	value, thousands	$104	--	Germany $60; Italy $25; United Kingdom $17.
Nickel:				
Matte and speiss		42	--	Spain 39; France 3.
Oxides and hydroxides	value, thousands	$24	--	Spain $21; France $2.
Metal including alloys:				
Unwrought		356	--	Netherlands 113; United Kingdom 62; Canada 53.
Semimanufactures		111	(2/)	Germany 49; Spain 27; France 9.
Platinum-group metals:				
Waste and sweepings	value, thousands	1	--	All from unspecified Europe.
Metal including alloys, unwrought and partly wrought:				
Palladium	do.	$32	--	Belgium-Luxembourg $20; Spain $11.
Platinum	do.	$168	--	Spain $109; Austria $31; Germany $16.
Rhodium	do.	$24	--	Italy $15; Spain $9.
Rare-earth, metals including alloys, all forms		2	--	Austria 1; Germany 1.
Selenium, elemental		7	--	United Kingdom 3; Spain 2; Belgium-Luxembourg 1.
Silicon, high-purity		160	--	All from Spain.
Silver, metal including alloys, unwrought and partly wrought	value, thousands	$12,210	$13	Germany $4,424; United Kingdom $3,549; Spain $3,246.
Tantalum, metal including alloys, all forms	do.	$111	$25	Germany $54; United Kingdom $32.
Tin, metal including alloys:				
Unwrought		1,351	2	Spain 516; Germany 336; United Kingdom 135.
Semimanufactures		170	(2/)	United Kingdom 112; Netherlands 34; Germany 18.
Titanium:				
Ore and concentrate		319	--	South Africa 306; Spain 13.
Oxides		3,475	60	Australia 1,142; Saudi Arabia 704; Belgium-Luxembourg 517.
Metal including alloys, all forms		86	58	Italy 15; Norway 8; Japan 2.
Tungsten:				
Ore and concentrate	value, thousands	$23	--	Italy $21; Germany $2.
Metal including alloys:				
Unwrought	do.	$104	$29	Brazil $67; France $6; Germany $1.
Semimanufactures	do.	$666	$3	Spain $327; Belgium-Luxembourg $155; France $47.

See footnotes at end of table.

TABLE 5--Continued
PORTUGAL: IMPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

			Sources	
Commodity		Total	United States	Other (principal)
METALS--Continued				
Uranium and thorium, metal including all forms:				
Uranium	value, thousands	$26	$26	
Thorium	do.	$39	--	All from Belgium-Luxembourg.
Vanadium, oxides and hydroxides	do.	$4	--	All from Germany.
Zinc:				
Ore and concentrate		400	--	All from Colombia.
Oxides		2,050	--	Spain 1,016; Colombia 360; United Kingdom 317.
Blue powder		576	--	Denmark 367; Belgium-Luxembourg 129; Spain 56.
Ash and residue		5,903	407	Spain 4,213; Norway 485; United Kingdom 440.
Metal including alloys:				
Scrap		54	--	All from Spain.
Unwrought		21,308	--	Spain 10,952; Belgium-Luxembourg 5,758; Norway 2,070.
Semimanufactures		6,399	2	Spain 2,785; France 897; South Africa 705.
Zirconium, ore and concentrate		4,375	18	Germany 1,896; Spain 1,145; Netherlands 936.
Other:				
Ores and concentrates		407	--	Netherlands 283; Spain 124.
Oxides and hydroxides		1,541	2	Spain 1,453; Germany 53; Belgium-Luxembourg 24.
Ashes and residues		966	--	All from Spain.
Base metals including alloys, all forms	value, thousands	$5	--	All from Switzerland.
Precious metals, n.e.s., waste and scrap	do.	$77	--	Spain $65; Italy $12.
INDUSTRIAL MINERALS				
Abrasives, n.e.s.:				
Natural, corundum, emery, pumice, etc.		2,529	19	Turkey 1,913; France 182; Spain 180.
Artificial:				
Corundum		1,610	4	France 748; Germany 313; Austria 262.
Silicon carbide		1,202	1	France 463; Denmark 255; Germany 211.
Dust and powder of precious and semiprecious stones including diamonds	value, thousands	$3,788	--	Spain $965; Belgium-Luxembourg $694; Ireland $572.
Grinding and polishing wheels and stones		2,493	12	Italy 1,188; Spain 551; Germany 259.
Asbestos, crude		6,302	--	Canada 5,162; Zimbabwe 377; South Africa 342.
Barite and witherite		3,656	--	Morocco 2,500; Netherlands 501; Spain 333.
Boron:				
Crude natural borates		14,400	--	Trukey 12,850; Spain 701; Argentina 565.
Oxides and acids		1,077	--	United Kingdom 708; Italy 168; Spain 118.
Cement	thousand tons	1,331	(2/)	Ukraine 290; Italy 228; United Kingdom 173.
Chalk		2,980	--	France 1,870; Belgium-Luxembourg 479; United Kingdom 428.
Clays, crude:				
Bentonite		18,847	106	United Kingdom 5,496; Spain 5,435; France 5,121.
Chamotte earth and dinas earth		1,841	--	France 1,028; Spain 673; Netherlands 73.
Fire clay		260	--	Germany 147; Spain 110; Italy 3.
Fuller's earth		57	40	Spain 17.
Kaolin		121,639	700	United Kingdom 87,459; Spain 22,393; France 9,467.
Other		5,565	90	Spain 4,429; United Kingdom 716; Germany 165.
Cryolite and chiolite		45	--	Germany 44; Spain 1.
Diamond, natural:				
Gem, not set or strung	value, thousands	$52,085	--	Belgium-Luxembourg $40,677; United Kingdom $5,514; Angola $3,160.
Industrial stones	do.	$2,211	--	Germany $1,775; Spain $214; Netherlands $185.
Dust and powder	do.	$3,706	--	Spain $965; Belgium-Luxembourg $620; Ireland $572.
Diatomite and other infusorial earth		1,667	729	Spain 479; France 410; Italy 40.
Feldspar		31,026	--	Spain 17,568; France 8,963; India 2,306.
Fertilizer materials:				
Crude, n.e.s.		7,131	1	Spain 4,600; France 1,280; Israel 1,076.
Manufactured:				
Ammonia		20,028	--	Estonia 9,987; Algeria 9,971; Spain 60.
Nitrogenous		174,634	--	Netherlands 47,572; Germany 36,001; Spain 33,346.
Phosphatic		947	--	Spain 946; France 1.
Potassic		70,005	--	Israel 25,307; Spain 18,997; Jordan 14,350.
Unspecified and mixed		153,387	21	Spain 43,760; Netherlands 28,708; Tunisia 23,014.

See footnotes at end of table.

TABLE 5--Continued
PORTUGAL: IMPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

		Sources	
Commodity	Total	United States	Other (principal)
INDUSTRIAL MINERALS--Continued			
Fluorspar	1,381	--	Spain 894; France 366; Belgium-Luxembourg 69.
Graphite, natural	378	--	Spain 302; Germany 41; China 21.
Gypsum and plaster	276,003	36	Spain 240,658; Morocco 27,310; Germany 5,481.
Iodine	25	--	Belgium-Luxembourg 11; Netherlandsa 6; Japan 5.
Kyanite and related materials:			
Mullite	471	--	Netherlands 460; United Kingdomm 11.
Unspecified	245	--	Spain 164; South Africa 80.
Lime	1,338	--	Spain 1,321; Germany 14; Denmark 3.
Magnesium compounds:			
Magnesite, crude	1,762	--	Spain 1,346; Italy 231; Greece 108.
Oxides and hydroxides	2,597	--	Spain 1,168; Netherlands 654; Italy 386.
Other	63	--	All from India.
Mica:			
Crude including splittings and waste	110	--	France 51; United Kingdom 31; Norway 18.
Worked including agglomerated splittings	18	(2/)	Kenya 8; Switzerland 5; Belgium-Luxembourg 2.
Nitrates, crude	754	--	Belgium-Luxembourg 742; Spain 8; Germany 4.
Phosphates, crude	183,954	--	Syria 154,063; Tunisia 20,100; Algeria 5,500.
Phosphorus, elemental	7	--	All from Germany.
Pigments, mineral:			
Natural, crude	14	--	France 7; Spain 5; United Kingdom 2.
Iron oxides and hydroxides, processed	2,344	--	Germany 1,075; Spain 763; Italy 118.
Precious and semiprecious stones other than diamond:			
Natural value, thousands	$1,255	$17	Germany $322; Switzerland $153; Brazil $151.
Synthetic do.	$1,345	--	Switzerland $357; Spain $330; United Kingdom $249.
Pyrite, unroasted	132	--	United Kingdom 80; Spain 52.
Quartz crystal, piezoelectric value, thousands	$34	--	Spain $27; Italy $6; Thailand $1.
Salt and brine	105,823	2	Spain 42,769; France 38,916; Netherlands 8,152.
Sodium compounds, n.e.s.:			
Soda ash, manufactured	35,773	--	Spain 35,275; France 471; Germany 26.
Sulfate, manufactured	45,398	--	Spain 45,189; France 203; Germany 5.
Stone, sand and gravel:			
Dimension stone:			
Crude and partly worked	76,258	91	Spain 39,356; South Africa 14,997; Brazil 7,763.
Worked	33,124	1	Spain 27,588; Sweden 1,529; Italy 1,487.
Dolomite, chiefly refractory-grade	9,770	2	Spain 7,454; Germany 1,591; United Kingdom 456.
Gravel and crushed rock	216,561	3	Spain 210,308; France 4,343; Italy 1,781.
Limestone other than dimension	1,659	--	France 1,652; Netherlands 7.
Quartz and quartzite	557	--	Italy 473; Germany 30; Spain 29.
Sand other than metal-bearing	121,038	55	Spain 117,568; Belgium-Luxembourg 1,960; France 858.
Sulfur:			
Elemental:			
Crude including native and byproduct	2,468	--	Spain 2,088; France 325; Belgium-Luxembourg 50.
Colloidal, precipitated, sublimed	4,576	--	Tunisia 2,592; Spain 1,952; France 25.
Dioxide	4,562	--	Sweden 3,835; Spain 716; Germany 11.
Sulfuric acid	172,649	1	Spain 118,939; United Kingdom 22,103; Germany 11,687.
Talc, steatite, soapstone, pyrophyllite	14,432	254	Spain 6,994; France 3,542; Belgium-Luxembourg 1,494.
Vermiculite, perlite, chlorite	991	--	France 707; South Africa 172; Spain 110.
Other:			
Crude	38,841	560	Spain 33,120; United Kingdom 1,551; Finland 914.
Slag and dross, not metal-bearing:			
Granulated slag (slag sand) from iron and steel industry	10,641	--	All from Spain.
Waste, scale, dross, slag of iron or steel industry	2,006	--	Do.
Slag and ash, n.e.s., including seaweed ash (kelp)	82,731	--	Spain 82,451; France 258; Italy 21.

See footnotes at end of table.

TABLE 5--Continued
PORTUGAL: IMPORTS OF MINERAL COMMODITIES IN 1998 1/

(Metric tons unless otherwise specified)

			Sources	
Commodity		Total	United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural		9,905	--	France 7,810; Spain 1,982; Germany 54.
Carbon black		5,520	--	Spain 2,297; Germany 2,034; France 832.
Coal:				
Anthracite		336,726	--	South Africa 336,711; Netherlands 15.
Bituminous	thousand tons	4,645	759	Colombia 1,756; South Africa 1,325; Venezuela 272.
Lignite including briquets		1	--	All from Germany.
All grades including briquets	thousand tons	4,990	759	Colombia 1,756; South Africa 1,667; Venezuela 272.
Coke and semicoke		13,022	--	Spain 8,655; France 2,402; Germany 1,964.
Gas, manufactured	value, thousands	$1	$1	
Gas, natural, gaseous		613,427	--	All from Spain.
Peat including briquets and litter		11,843	--	Germany 6,006; Ireland 2,713; Netherlands 1,420.
Petroleum:				
Crude	thousand 42-gallon barrels	98,441	578	Saudi Arabia 19,260; Iran 16,924; Nigeria 16,500.
Refinery products:				
Liquefied petroleum gas	do.	14,359	69	Spain 7,591; United Kingdom 5,056; Libya 378.
Mineral jelly and wax	42-gallon barrels	101,436	165	Spain 56,955; China 19,211; Germany 17,889.
Asphalt	thousand 42-gallon barrels	1,875	--	Spain 1,533; France 316; unspecified 25.
Bitumen and other residues	do.	1,931	--	Spain 1,534; France 316; unspecified 74.
Bituminous mixtures	42-gallon barrels	57,982	(2/)	Spain 46,008; France 7,714; United Kingdom 3,030.
Petroleum coke	thousand 42-gallon barrels	2,211	1,036	Venezuela 544; Aruba 435; Spain 184.
Unspecified	do.	21,043	163	Spain 5,068; United Kingdom 3,477; Netherlands 1,943.

1/ Table prepared by Glenn J. Wallace, International Data Unit.

2/ Less than 1/2 unit.

Source: United Nations Statistical Office (microfiche).

THE MINERAL INDUSTRY OF

SPAIN

By Harold R. Newman

Spain, which has some of the most mineralized territory in Western Europe, was a significant European producer of nonferrous and precious metals. The main polymetallic deposits, from west to east, include Tharsis, Scotiel, Rio Tinto, and Aznalcollar. In terms of value of mine output of metallic and nonmetallic minerals and quarry products, Spain was one of the leading European Union (EU) countries. Consequently, it had one of the highest levels of self-sufficiency with respect to mineral raw materials among the EU members. Of the approximately 100 mineral products mined, only 18 were produced in significant quantities—bentonite, copper, fluorspar, glauberite, gold, iron, lead, magnetite, mercury, potash, pyrites, quartz, refractory argillite, sea and rock salt, sepiolitic salts, tin, tungsten, and zinc (table 1).

Spain has a long history of base-metal mining, and although the number of active operations has halved in recent years, with copper production a notable casualty, the country remained an important lead and zinc producer. Moreover, several old and new prospects were being evaluated, and the level of exploration activity was high. Exploration was continuing for feldspar (Badajoz, Toledo, and Salamanca), garnet (Galicia), pyrites (Badajoz), and rutile and zircon (Cuidad Real).

Deposits vary widely in terms of age and geologic setting, with kuroko, sedimentary exhalative, and Mississippi-Valley-type replacement deposits and copper-gold skarns all represented, as well as the volcanic-hosted massive sulfide (VMS) deposits of the Iberian Pyrite Belt (IPB) of southern Spain. The IPB alone was estimated to have yielded around 1,700 million metric tons (Mt) of sulfides, and more than 80 VMS deposits have been recorded where individual tonnages were in excess of 1 Mt (Mining Journal, 2000b).

The mineral industry comprised a mix of state-owned, state and privately owned, and privately owned companies. Minerals belong to the state under an arrangement known as the Regalía Principal. The mining law of July 19, 1944, as amended, and the Hydrocarbon Law of December 26, 1950, govern the mineral industry. The Ministerio de Industria y Energía [Ministry of Industry and Energy] implements the mineral laws, regulates the private sector, and manages most of the state-owned companies through the Instituto Nacional de Industria (INI) (a state holding company). INI and Instituto Geológico y Minero are the principal Government mineral-resource agencies.

Production far exceeded domestic consumption for most nonmetallic minerals, thus leaving surpluses for export. The economic development of certain areas, such as the Asturias and the Basque regions, was based on their mineral wealth, and mining continued to be an important current and potential source of income in these and other mineral-rich areas. Trade flows were liberalized after Spain joined the EU, and the differences between Spanish tariffs and EU Common Market tariffs were significantly reduced. The mineral-related commodities in which Spain was a net exporter to other EU countries, thereby reducing its trade deficit, were lead, mercury, nonmetallic minerals manufactured products, slate and other crude industrial minerals, and zinc.

Some of Spain's regional governments showed interest in the development of mining in their territory. The independent government of Andalucia (the junta de Andalucia) completed its first mining development plan (1996-2000), which involved large shareholders in the investigation and exploitation of mineral resources, the development of mining technology, and the reform of the junta's own mining administration (Mining Journal, 2000b).

Economically speaking, 2000 appeared to be a good year for Spain. The gross national product grew by 3.5%, which was only slightly lower than the 3.8% achieved in 1999. There was an upsurge in private consumption and in expenditure on construction. Recorded unemployment at the end of 1999 was equivalent to 9.8% of the working population

Productive capacity was running at more than 80%, and the industrial production index showed an annual overall increase (table 2). The Spanish Government influenced the economy primarily through regulation rather than through direct ownership, though the Government does own all or part of a few of Spain's largest companies (table 3). Spain has moved rapidly toward privatization out of conviction and owing to the limited options available for curbing the budget deficit. Successful privatizations included Telefonica S.A., Gas Natural S.A., and the petrochemical company Repsol S.A. The remaining state shares of Iberia Airlines were to be sold by yearend (U.S. Embassy, Madrid, Spain, 2000, p. 9-10).

With a few exceptions, mine production continued at about the same level as that of 1999. Of the major metals, commodities with a significant increase in metal production were copper, lead, and zinc in ore. Production of silver decreased, and since 1999, cadmium metal production and iron ore mining ceased altogether. Total refined copper production increased marginally, and secondary lead metal output increased. Primary aluminum metal production stayed about the same. The mercury mines at Almadén continued to produce at levels in accordance with market demand.

Among industrial minerals, fluorspar and potash production decreased, and magnesite production increased. Quarried mineral products, particularly quarried stone, accounted for a significant share of the value of all mineral production in Spain. In mineral fuels and related materials, natural gas output increased, and petroleum output decreased by about 26%. Spain's production of crude oil was limited, and the country continued to be a large importer of mineral fuels.

Commodity Analysis

Spain was one of the larger coal producers in the EU, with an output of more than 23 Mt in all types of coal in 2000. Coal reserves were abundant but difficult to mine. Consequently, the cost of production was high, which made Spanish coal less competitive than that of many other countries. The leading producer of bituminous coal was Huelleras del Norte S.A., and the leading producer of lignite was Empresa Nacional de Electricidad S.A.

Dowa Mining Co. Ltd. of Japan and Rio Tinto plc of the United Kingdom formed a joint venture to explore for metals at properties owned by Rio Tinto in the IPB. Dowa can earn a 33% interest in the properties by contributing to exploration over the next 3 years, although no details were given as to the amount to be contributed (Mining Magazine, 2000a).

Alumina and primary aluminum were produced almost entirely by Alcoa Inespal S.A. Alcoa was a holding company with three primary aluminum plants and three flat-rolled sheet and extrusions plants. Alúmina Española S.A. (a subsidiary of Alcoa located near San Ciprián) was Alcoa's only producer of alumina and alumina hydrates in Europe. The company was also a producer of primary aluminum in standard sheets and special aluminum alloys.

Cambridge Mineral Resources plc of the United Kingdom entered into a conditional agreement to acquire three properties Falle de Leon, Lomero-Potayos, and Salamon, through a reverse takeover in which it acquired Recursos Metallicos SL. Located within the IPB, Lomero-Potayos is made up of two contiguous advanced gold-enriched polymetallic deposits that contain estimated indicated resources of 4.25 Mt at 5.76 grams per metric ton (g/t) gold, 116.9 g/t silver, 1.58% copper, 1.48% lead, and 5.71% zinc in massive sulfides. Salamon is an epithermal gold prospect in northern Spain estimated to contain 443,000 metric tons (t) at 7.86 g/t gold. Falle de Leon covers 2,100 square kilometers (km^2) and is contiguous with Salamon (Mining Journal, 2000a).

Navan Resources (Almagrera) Ltd.'s Aguas Teñidas copper-lead-zinc mine near Huelva was operating at the full 600,000-metric-ton-per-year (t/yr) rate following the completion of the capital works improvement program. The Aguas Teñidas Mine supplies Navan's nearby Almagrera mill and concentrator (formerly owned by Almagrera S.A.). Navan also operates the Almagrera Mine. The Almagrera operation was marginal and had incurred significant losses until Navan developed the higher graded ore of the Aguas Teñidas Mine (Mining Journal, 2000c).

Final approval for the commencement of open pit mining operations at the Carles gold deposit was received by Rio Narcea. Operations began in late 2000 with an expected rate of about 600 kilograms per year. Rio Narcea estimated that Carles hosts 1.2 Mt of proven and probable reserves with an average grade of 4.26 g/t gold, of which 728,000 t averaged 3.89 g/t gold is minable by open pit methods (Mining Magazine, 2000b).

Barrick Gold Corp. and Rio Narcea Gold Mines Ltd. had signed a joint-venture agreement for Barrick's participation in some of Rio Narcea's gold projects (Mining Journal, 2000d). Barrick, which owned 60% of the joint venture to explore the Rio Narceas, the Navelgas, the Palencia-Leon, and the Venteniella gold belts in northern Spain, withdrew at yearend. The joint venture did not cover Rio Narcea's El Valles and Carlés project areas. The joint venture had completed 3,400 line kilometers of airborne geophysical surveying in the Rio Narcea and the Navelgas belts and had drilled 26 holes that totaled 10,848 meters to test individual targets (Northern Miner, 2000).

A principal producer of iron ore was Compañia Andaluza de Minas S.A., which had worked its open pit mine at Alquife (Granada). Mining was halted in October 1996, resumed briefly, then halted again. The mine remained inactive at yearend 2000 owing to market conditions. The very small amount of iron ore produced was for nonmetallic applications.

Arbed Group of Luxembourg's Spanish affiliate Aceralia S.A. was continuing negotiations with Mexico's Grupo Acerero del Norte (GAN) and creditor banks for a possible joint venture with Altos Hornos de Mexico S.A. (Ahmsa), which was a 3.7-Mt liquid-steel capacity integrated steelmaker. As Ahmsa's major shareholder, GAN would like to restructure the company's $1.8 billion debt. Ahmsa defaulted on interest payments and won legal protection against its creditors in May 1999. The Aceralia-Ahmsa deal would include the joint operation of mills that would account for about one-half of Ahmsa's 3.7-Mt capacity along with its domestic service and distribution centers. The mills produced sheet, beams, bars, tinplate, and structural sections at Ahmsa's works in Monclova, Coahuila, Mexico (Metal Bulletin, 2000a).

Spain's production of coated steel rose by about 20% in 1999 and increased even more in 2000 as newly installed capacity ramped up to full production rates. Much of Spain's galvanized sheet production takes place at Sagunto on the country's Mediterranean coast (Metal Bulletin, 2000c).

Aceralia inaugurated the new galvanizing line at its Avilés works in northern Spain. The capacity will be 400,000 t/yr of coils 750 to 1,600 millimeters (mm) wide and 0.4 to 2 mm thick. The $7 million investment was directed at securing Aceralia a dominant position in the supply of galvanized sheets to the Spanish automobile industry, in which it aimed to hold a 70% market share. Aceralia operated galvanizing lines at Sagunto (400,000 t/yr) and Lesaca (225,000 t/yr) and held a 25% stake in the Solmed galvanizing line (400,000 t/yr) whose majority owner was Sollac of France (Metal Bulletin, 2000b).

Boliden Apirsa S.A.'s Los Frailes Mine, which was one of the biggest open pit zinc mines in Europe, was closed in early 1998 after a large toxic spill. Mining operations started mid-1999 after the license and a permit to dump tailings in the Aznalcóllar open pit were granted. The mine has been operating at a loss since reopening. Boliden was intending to continue operations until the planned completion of pit 2 in 2001, but not to proceed with the next phase, which was a pushback for pit 3. Boliden was looking for ways to continue operations after pit 2 is mined out, including sale of the property. If this effort is not successful, then the mine will be shut down (Engineering and Mining Journal, 2000).

Spain was Europe's only celestite producer and the second largest producer in the world after Mexico and had the largest known world reserves of celestite. The celestite sector was experiencing a production boom related to a $23 million strontium carbonate plant in Cartagena, which was inaugurated in early 2000. The plant was built by Quimica del Estroncio S.A. and had a capacity of 22,000 t/yr, about 20% of world production (Industrial Minerals, 2000a).

Caustic and sintered grades of magnesite were produced in Spain for nonrefractory and refractory markets, and crude magnesite was produced from deposits located in Navarra and Lugo that were used to make magnesia-based refractory bricks. Output from both was on an upward trend in the 1990s. The increase in crude magnesite production reflects improvements in the steel industry, where refractory bricks are used to line furnaces. Total production was worth about $20.5 million (Industrial Minerals, 2000b).

Magnesitas Navarras S.A. was set to be privatized completely following Magna Inversiones S.A.'s acquisition of a 51% interest in Magnesitas. The sale left the state-owned enterprise Mafinco with a 48.7% interest and the Belzance family (owners of the mining concession) with 0.3% interest. Upon fulfilment of an investment program, Magna will have the right to increase its stake in Magnesitas to more than 99%. Magnesitas has a combined capacity for dead burned and caustic magnesia of 140,000 t/yr, which it produced at its plant at Zubiri, Navarra (Industrial Minerals, 2000c).

Spain maintained its world leadership in sepiolite production and holds 70% of the world's reserves, mostly located around Madrid. The largest deposit was thought to be in excess of 15 Mt. High freight costs, however, have reduced profitability, so speciality clay producers were tending to concentrate on alternative markets, such as pet litter, foundry, and rheological additives (Industrial Minerals, 2000d).

Spain's electric utilities were likely to be at the front of cross-border moves in the rapidly consolidating industry in Europe. Spain has moved to partially liberalize its power market and brought forward the date for full competition to 2003, which is 4 years earlier than previously scheduled. A process of energy sector consolidation was sweeping Europe as companies sought economies of scale to compensate for lower electricity prices following the market's liberalization (Alexander's Gas and Oil Connections, August 18, 2000, Spain's power market to be in full competition by 2003, accessed September 7, 2000, at URL http://www.gasandoil.com/goc/company/cne03342.htm).

Although coal is Spain's most plentiful indigenous energy source, it is too expensive to extract to be competitive in a free energy market. All the major coal companies were state owned, and the Spanish Government subsidized coal production. The EU requires that mining subsidies be phased out; the European Commission (EC), however, can authorize payments where aid can be shown to be assisting in the restructuring of an industry that might falter without public money. The EC agreed that Spain could provide about $1 billion in state aid to modernize and restructure its coal industry. In this case, the EC ruled that Spain's coal aid package was in conformity with the EU's plan to modernize, restructure, and reduce the activity of the EU coal industry between 1998 and 2002 (U.S. Energy Information Agency, January 2001, Spain—Coal, Country Analysis Brief, accessed July 17, 2001, at URL http://www.eia.doe.gov/emeu/cabs/spain.html).

Repsol S.A. won control of Argentina's largest oil group YPF S.A. with a $15 billion takeover, which doubled Repsol's size and turned it into one of the world's 10 largest oil firms. Repsol also merged its Argentine unit Astra S.A., which was an exploration and production company, with YPF.

The world's largest oil, electricity, and gas groups have begun moves toward integration. Crude producers were attracted toward power companies, and gas and electricity groups were in search of a steady supply of raw materials (Alexander's Gas and Oil Connections, February 2000, Repsol looking at different options for expansion, accessed February 24, 2000, at URL http://www.gasanoil.com/goc/company/cne00685.htm).

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Major Sources of Information

Instituto Geológico y Minero
Rio Rosas, 23
28003 Madrid, Spain
Ministerio de Industria y Energía
Doctor Fleming, 7
28036 Madrid, Spain

TABLE 1
SPAIN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Aluminum:						
Alumina 3/		1,094,797	1,110,300	1,100,000	1,100,000 e/	1,200,000
Metal:						
Primary		361,829	359,904	361,900	363,900	365,700 4/
Secondary		153,837	153,800	154,000	224,000	240,500 4/
Cadmium metal		307	301	196	--	--
Copper:						
Mine output, Cu content		38,392	37,833	37,002 r/	1,738 r/	23,312 4/
Metal:						
Blister:						
Primary		248,500	288,900	304,330	252,000 r/	264,800 4/
Secondary e/		22,400	23,800	30,000	53,000 r/	65,000 4/
Total		270,900	312,700	334,330	305,000 r/	329,800 4/
Refined:						
Primary		210,000	229,000	239,600 4/	250,756 4/	250,800 4/
Secondary		54,000	63,300	64,700	65,000	65,000
Total		264,000	292,000	304,330 4/	315,756 4/	315,800 4/
Germanium oxide, Ge content	kilograms	6,478	6,500	6,500 e/	6,000 e/	6,000
Gold, mine output, Au content	do.	2,832	1,824	3,295	5,018 r/	5,000
Iron and steel:						
Iron ore and concentrates, Fe content	thousand tons	588	58	--	--	--
Metal:						
Pig iron	do.	4,127	3,926	4,235	4,146	4,059 4/
Ferroalloys, electric furnace	do.	1,392	1,650	1,781	1,600 e/	1,800
Steel, crude	do.	12,038	13,644	14,827	14,886 r/	15,844 4/
Steel, hot rolled	do.	11,647	12,421	13,259	13,846 r/	14,599 4/
Lead:						
Mine output, Pb content		23,826	23,900	18,800 r/	15,000 r/	51,000
Metal, secondary e/		86,000	74,900	90,000	96,000 r/	120,000
Mercury, metal	thousand tons	862	389	675	433	500
Silver, mine output, Ag content	kilograms	108,901	66,000	47,000	96,000	70,000
Tin, mine output, Sn content e/		1,917 4/	2,000	2,000	2,000	2,500
Titanium dioxide e/		18,000	18,000	16,000	16,000	16,000
Uranium, mine output, U_3O_8 content	thousand tons	424	425	335	362 r/	401 4/
Zinc:						
Mine output, Zn content		139,589	171,800	128,100	109,400	200,000
Metal, primary and secondary		360,800	364,200	358,300	393,000 r/	391,000 4/
INDUSTRIAL MINERALS						
Barite, $BaSO_4$		28,000	90,000	70,000	62,000	60,000
Bromine e/		100	100	100	100	100
Calcium carbonate e/		1,650	1,750	1,880	1,950 r/	2,000
Cement, hydraulic, other than natural	thousand tons	25,157	27,632	27,943 r/	30,800 r/	30,000
Clays:						
Attapulgite e/		130,140 4/	125,000	130,000	130,000	125,000
Bentonite		151,155	170,000 e/	193,000	190,000 e/	175,000
Kaolin, washed		317,918	296,000	310,000	320,000 r/	365,000 4/
Other e/	thousand tons	15,000	20,000	20,000	15,000	15,000
Diatomite and tripoli e/		34,492 4/	36,000	56,000	60,000	50,000
Feldspar		415,189	398,000	430,000	450,000 r/	460,000 4/
Fluorspar, CaF_2 content						
Acid-grade		109,085	110,000 e/	110,000 e/	133,000 r/	120,000 4/
Metallurgical-grade		7,441	10,000 e/	14,000 e/	9,000 r/	6,000 4/
Total		116,526	120,000 e/	124,000 e/	142,000 r/	126,000 4/
Gypsum and anhydrite, crude	thousand tons	8,191	8,300	7,500	9,450 r/	9,398 4/
Kyanite, andalusite, related materials e/		2,000	2,500	2,500	2,500	2,000
Lime, hydrated and quicklime e/	thousand tons	1,500	1,500	1,500	1,500	1,500
Magnesite, calcined		150,000 e/	171,000	201,000	211,000 r/	266,000 4/
Mica		2,507	2,500	2,500 e/	2,500 e/	2,500
Nitrogen, N content of ammonia	thousand tons	466	497	460 e/	437	442 4/
Pigments, mineral: e/						
Ocher		8,000	8,000	7,000	7,000	7,000
Red iron oxide		15,000	15,000	15,000	15,000	15,000

See footnotes at end of table.

TABLE 1--Continued
SPAIN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
INDUSTRIAL MINERALS--Continued						
Potash, K_2O equivalent		717,064	639,000	597,000	656,000	653,000 4/
Pumice e/		700,000	600,000	600,000	600,000	600,000
Pyrite, including cuprous, gross weight	thousand tons	1,042	993	868	733	750
Salt:						
Rock, including byproduct from potash works	do.	2,216	2,200 e/	2,200	2,200	2,300
Marine and other	do.	1,220	1,400 e/	1,200	1,400	1,500
Sand and gravel, silica sand e/ 5/	do.	5,300	5,800	6,200	6,550 r/	6,600
Sepiolite, meerschaum		761,596	695,000	750,000	800,000	750,000
Sodium compounds, n.e.s.:						
Soda ash, manufactured e/	thousand tons	500	500	500	500	500
Sulfate, natural:						
Glauberite, Na_2SO_4 content		667,177	650,000	650,000	675,000	660,000
Thenardite, Na_2SO_4 content		187,746	180,000 e/	180,000 e/	200,000	200,000
Manufactured e/		100,000	125,000	125,000	125,000	125,000
Stone: e/						
Chalk	thousand tons	140	140	136 r/	136 r/	140
Dolomite	do.	5,100	5,400	5,000	9,080 r/	8,700 4/
Limestone	do.	2,400	2,500	2,200	2,200	2,500
Marble, ornamental	do.	2,347 4/	2,400	2,400	3,850 r/	3,687 4/
Marl	do.	8,500	8,950	9,845 4/	10,030 r/	9,966 4/
Basalt	do.	1,200	1,400	1,000	1,000	1,000
Granite, ornamental	do.	1,295 4/	1,400	1,400	1,750 r/	1,188 4/
Ophite	do.	2,200	2,200	2,000	2,000	2,000
Phonolite	do.	650	650	650	650	600
Porphyry	do.	800	800	1,000	1,000	1,000
Quartz	do.	1,438 4/	1,520	1,500	1,720 r/	1,700
Quartzite	do.	2,200	2,400	2,000	2,200	200
Sandstone	do.	2,600	2,500	2,500	2,500	2,500
Serpentine	do.	900	900	1,000	1,000	1,500
Slate	do.	705	555	615 4/	600	600
Other	do.	1,134 4/	1,000	1,000	1,000	1,000
Strontium minerals, Sr_2O_4 content		114,829	92,000 e/	111,000	110,000 r/	112,000
Sulfur:						
S content of pyrites	thousand tons	439	480	430	388	400
Byproduct: e/						
Of metallurgy	do.	420	250	461	455	460
Of petroleum	do.	250	150	100	110	100
Of coal (lignite) gasification	do.	1	2	1	1 r/	1
Total sulfur	do.	1,110	882	992	954 r/	961
Talc and steatite		109,756	110,000 e/	110,000 e/	111,000	110,000
MINERAL FUELS AND RELATED MATERIALS						
Coal (marketable):						
Anthracite	thousand tons	6,487	6,678	6,393	4,890 r/	4,651 4/
Bituminous	do.	7,195	7,200 e/	6,004	6,828 r/	6,681 4/
Lignite (black and brown)	do.	9,604	12,577	13,675	12,535	12,153 4/
Total	do.	23,286	26,455	26,072	24,253 r/	23,485 4/
Coke, metallurgical	do.	2,403	2,622	2,649	2,332 r/	2,470 4/
Gas, natural (marketed)	million cubic meters	466	178	114	143 r/	179 4/
Peat e/		50,000	60,000	50,000	50,000	50,000
Petroleum:						
Crude	thousand 42-gallon barrels	3,846	2,850	4,013	2,295	1,700
Refinery products:						
Liquefied petroleum gas	do.	17,655	18,954	18,096	18,000	18,000
Naphtha	do.	19,797	22,899	24,990	25,000	25,000
Gasoline, motor	do.	83,113	78,497	84,405	85,000	85,000
Jet fuel	do.	33,504	33,000	36,000	36,000	36,000
Kerosene	do.	15,000	20,000	30,000	30,000	30,000
Distillate fuel oil	do.	129,080	138,249	148,969	150,000	150,000
Residual fuel oil	do.	73,213	77,276	86,407	85,000	85,000
Other e/	do.	50,500	35,500	37,400	38,000	38,000
Refinery fuel and losses e/	do.	12,000	12,000	10,000	10,000	10,000
Total e/	do.	434,000	436,000	476,000	477,000	477,000

See footnotes at end of table.

TABLE 1--Continued
SPAIN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

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e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through June 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reflects aluminum hydrate.

4/ Reported figure.

5/ Includes sand obtained as a byproduct of feldspar and kaolin production.

TABLE 2
SPAIN: SELECTED INDICES OF PRODUCTION

(1990 = 100)

Sector	1997	1998	1999	2000 e/
General	109	115	118	122
Mining	90	90	88	91
Manufacturing	110	116	120	124
Electricity and gas	109	110	117	127

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no. 12, December, p. 32.

TABLE 3
SPAIN: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Alumina Española S.A. (Alcoa Inespal)	Alumina plant at San Ciprián, Lugo	1,000
Aluminum	Aluminio Español S.A. (Alcoa Inespal)	Electrolytic plant at San Ciprián, Lugo	180
Do.	Industria Española del Aluminio, S.A. (Alcoa Inespal)	Electrolytic plant at Avilés	100
Do.	do.	Electorlytic plant at La Coruña	25
Coal:			
Anthracite	Antracitas Gaiztarro S.A.	Mines at María and Paulina	2,000
Do.	Antracitas de Gillón S.A.	Mines near Oviedo	2,000
Do.	Antracitas del Bierzo S.A.	Mines near León	1,000
Bituminous	Hulleras del Norte S.A. (Hunosa)	Various mines and plant	3,300
Do.	Hulleras Vasco Leonesa S.A.	Santa Lucia Mine, Leon	2,000
Do.	Minas de Figaredo S.A.	Mines near Oviedo	1,000
Do.	Nacional de Carbon del Sur (Encasur)	Rampa 3 and San Jose Mines, Cordoba	200
Lignite	Empresa Nacional de Electricidad S.A. (Endesa)	As Pontes Mine, and Andorra Mine, La Coroña	15,000
Barite	Minas de Baritina S.A. (Kali-Chemie of Germany, 100%)	Mine and plant in Espiel area, Córdoba	50
Cement	Approximately 36 cement companies, of which the largest is: Asland S.A.	54 plants, including: 5 (Asland) plants, of which the largest ones are plants at Puerto de Sagunto, Valencia, and at Villaluenga de la Sagra, Toledo	44,000 (6,000) (2,000) (2,000)
Copper:			
Metal	Atlantic Copper Holding S.A. (Freeport MacMoRan Inc., 65%, Ercros Group, 35%)	Refinery at Huelva	270
Do.	do.	Electrolytic refinery at Huelva	105
Do.	Industrias Reunidas de Cobre	Smelter at Asua-Bilbao	30
Do.	Electrolitico y Metales S.A.	Fire and electrolytic refinery at Asua-Bilboa	36
Ore, metal content	Atlantic Copper Holding, S.A. (Freeport MacMoRan Inc., 65%, Ercros Group, 35%)	Mines and plant at Arientero, near Santiago de Compostela, Corta Atalay open pit mine, Cerro Colorado open pit mine	12
Do.	do.	Alfredo underground mine in Rio Tinto area	30
Do.	Navan Resources Ltd.	Migolas and Sotiel areas	6
Dunite	Pasek España S.A.	Mines and plant at Landoy, Ortigueira	1,500
Fluorspar, ore	Fluoruros S.A. (Bethelhem Steel Corp., 49%)	Plant at Caravia, near Colunga	400

TABLE 3--Continued
SPAIN: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Fluorspar, ore--Continued:		Fluoruros S.A. (Bethelhem Steel Corp., 49%)	Opencast mines at San Lino and Val Negro and underground mine at Eduardo, near Carav, all in Asturias	350
Do.		do.	Plant at Collada, mines at Venros Sur and Corona	200
Gold	kilograms	Rio Narcea Gold Mines, Ltd.	Belmonte de Miranda, Asturias	3,750
Iron ore		Compañia Andaluza de Minas S.A. (Mokta, 62%)	Mine at Alquife, Granada (closed for maintenance)	4,000
Lead:				
Metal		Sociedad Minera y Metalúrgica de Peñarroya de España S.A. (Peñarroya, France, 98%)	Smelter at Cartagena, Murcia	60
Do.		do.	Refinery at Cartagena, Murcia	60
Do.		Compañia La Cruz, Minas y Fundaciones de Plomo S.A.	Smelter at Lineares, Jaén	40
Do.		do.	Refinery at Lineares, Jaén	40
Do.		Tudor S.A.	Secondary smelter at Saragoza	16
Do.		Ferroaleaciones Españolas, S.A.	Secondary smelter at Medina del Campo	12
Do		Derivados de Minerales y Metales	Secondary smelter at Barcelona	5
Ore		Sociedad Minera y Metalúrgica de Peñarroya de España S.A. (Peñarroya, France 90%)	Opencast mine at Montos de Los Azules	25
Do.		Andaluza de Piritas S.A. (APIRSA)	Opencast mine at Aznalcóllar, Sevilla	21
Do.		Exploración Minera International España S.A. (EXMINESA)	Underground mine at Rubiales, Lugo	16
Magnesite		Magnesitas de Rubián S.A.	Plants at Zubiri	100
Do.		do.	Mines and plant near Sarria, south of Lugo	220
Mercury	flasks	Minas de Almadén y Arrayanes S.A, (Government, 100%)	Mines and smelter at Almadén	70,000
Petroleum:				
Crude	barrels per day	Chevron S.A.	Oilfield at Casablanca	300
Refined	do.	Repsol Petróleo S.A.	Refineries at Escombreras	200,000
Do.	do.	do.	Puertollano	14,000
Do.	do.	do.	Tarragona	260,000
Do.	do.	Refineria de Petróleos del Norte S.A. (Petronor)	Refinery at Somorrostro	240,000
Do.	do.	Compañía Española de Petróleos S.A. (Cepsa)	Refinery at Santa Cruz de Tenerife	160,000
Do.	do.	Petroleos del Mediterraneo S.A. (Petromed)	Refinery at Castellón de la Plana	120,000
Do.	do.	Compañía Iberica Refinadora de Petróleos S.A. (Petroliber)	Refinery at La Coruña	140,000
Potash, ore		Iberpotash S.A. (Dead Sea Works Ltd., 60%; La Seda S.A., 20%; Tolsa S.A., 20%)	Mines and plants at Suria, near Barcelona	850
Pyrite		Compañia Española de Mines de Tharsis	Mines and plants at Tharsis and Zarza, near Seville	1,300
Do.		do.	Plant at Huelva	600
Do.		Rio Tinto Minera S.A. (Rio Tinto plc, 75%; Rio Tinto Zinc, 25%)	Mines and plant at Rio Tinto, near Seville	900
Sepiolite		Tolsa S.A.	Mine and plant at Vicalvaro, near Madrid	100
Do.		Silicatos-Anglo-Ingleses S.A.	Mine and plant at Villecas near Madrid	200
Sodium sulfate		Crimidesa S.A.	Mine and plant at Cerezo de Rio, Burgos	600
Steel		Aceralia Corporación Siderúrgica (Arbed S.A., 35%)	Plants at Avilés, Gijon, Sagunto, and Sestao,	8,000
Strontium		Solvay Minerales S.A.	Mines and plant at Escuzar, Granada	85
Do.		Canteras Industriales S.A.	Mine and plant at Montevives, Granada	50
Uranium, U_3O_8	metric tons	Empresa Nacional del Uranio (Government, 100%)	Mines and plant near Ciudad Real	500
Zinc:				
Metal		Asturiana de Zinc S.A. (Glencore International AG, 44%)	Electrolytic zinc plant at San Juan de Nieva	320
Ore		do.	Reocin mines and plants near Torrelavega, Santander	500
Do.		Boliden Apirsa S.A. (Boliden Ltd., 100%)	Los Frailes Mine at Aznalcóllar	3,500
Do.		Exploración Minera International España S.A. (EXMINE S.A.)	Underground mine at Rubiales, Lugo	500
Do.		Sociedad Minera y Metalúrgica de Penarroya-Espana S.A.	Mines and plants at Montos de los Azules y Sierra de Lujar, San Agustin	200

THE MINERAL INDUSTRY OF

SWEDEN

By Chin S. Kuo

In 2000, Sweden continued to be among the most active mining countries in Europe. Important mineral commodities that were mined and exploited included base metals (copper, lead, and zinc), industrial minerals (dolomite, feldspar, granite, ilmenite, kaolin, limestone, marble, and quartz), and iron ore. Swedish steelmaker Svenskt Stal AB (SSAB) was well-known for producing high-quality steel.

Tertiary Minerals Ltd. of the United Kingdom completed drilling at its Windfall polymetallic property in Bergslagen District. The results identified an extension of the strike of mineralization at Windfall and discovered a second zone of mineralization at Sortarnan. Tertiary Minerals was to conduct a detailed geochemical survey in the area (Mining Magazine, 2000b).

Glencore International AG of Switzerland acquired Kubikenborg Aluminum AB, which owned the 100,000-metric-ton-per-year (t/yr) smelter at Sundsvall in Sweden. The smelter worked exclusively for Glencore under a tolling agreement—Glencore supplied all the smelter's alumina and purchased all the aluminum it produced. The purchase helped to secure access to supplies supporting Glencore's metal trading activities (Financial Times, 2000).

Boliden Mineral AB reopened its open pit Aitik copper mine in northern Sweden, which was closed for a weekend after a 100-meter (m) section of tailing containment failed. The concentrator milled 150,000 t/yr of ore. In 2000, the company completed the $245 million expansion at its Ronnskar smelter to increase capacity to 240,000 t/yr from 140,000 t/yr of copper cathode. The expansion included a new flash furnace, a new anode casting plant, a new converter aisle, an expanded tank house, and an expanded sulfur production plant. Production cost would be lowered by 25% per metric ton of copper (Metal Bulletin, 2000b).

In another development, Inmet Mining Corp. of Canada entered into an option and joint-venture agreement in connection with the copper/zinc sulfide deposits of Boliden in Bergslagen District. The area covers approximately 150 square kilometers of mineral properties. Inmet had the option to earn a 50% interest in the properties by incurring $8.5 million in exploration expenditures prior to yearend 2005 (Canada NewsWire, May 1, 2000, Inmet announces earn-in agreement, accessed May 1, 2000, at URL http://www.newswire.ca/releases/May2000/01/c0232.html).

Dragon Mining NL of Australia completed the reverse circulation and diamond drilling program begun in April on its Svartliden gold project. A total of 3,448 m of reverse circulation and 1,329 m of diamond core drilling was completed. The results contained further intercepts of high-grade mineralization that continued to confirm the continuity and grades of lode systems (Australian Mining & Exploration, September 14, 2000, Company news—Dragon Mining—Further drilling results from Svartliden gold project, accessed September 16, 2000, at URL http://www.reflections.com.au/MiningandExploration/Companies/NewsSep00.html).

Billiton Resources of the United Kingdom agreed with Redmond Ventures Corp. to explore Redmond's Copper Lake iron oxide/copper/cobalt property in Norrbotten. The main target was a series of magnetic geophysical anomalies. Drilling of these anomalies yielded intersections of rocks interpreted to be geologically similar to the Olympic-Dam-type mineral deposits in Australia (Mining Magazine, 2000a). Billiton would have the right to earn an initial 50% interest in the property by incurring a work expenditure of $1 million during a 4-year period.

Luossavaara-Kiirunavaara AB spent $42.5 million on the new main haulage levels at the Kiruna and the Malmberget iron ore mines. All iron ore production at Kiruna had been via the new main level at a depth of 1,045 m since July 1999, and the new main level at Malmberget was partly operational in April. The company also prepared for mining the northern part of the Kiruna ore body. The total cost of the project was estimated to be $40 million, and production was scheduled to start in 2003 (Metal Bulletin, 2000c).

Total pig iron production decreased by 2.1% to 3.15 million metric tons (Mt). Output of crude steel reached 5.23 Mt, which was up from 5.07 Mt in 1999, despite the closure of SSAB's Lulea blast furnace for a reline. Stainless steel production rose by 14% to 807,800 metric tons. The country's mills were running at 100% of capacity utilization. Strong worldwide demand drove the increases in production (Metal Bulletin, 2001).

AvestaPolarit Oyj Abp was to be formed from the merger of Avesta Sheffield and Outokumpu Oyj of Finland in January 2001. In Sweden, Avesta would produce heavy stainless steel, and Nyby and Langshyttan would deal with very thin material. The Tornio mill in Finland would produce mostly slab and cold-rolled coil. There were no plans to sell off or close the 300,000-t/yr Degerfors plant and the Avesta Sandvick Tube and the Fagersta Stainless facilities for long products, all located in Sweden (Metal Bulletin, 2000a).

Boliden Mineral AB and North Atlantic Natural Resources AB (NAN) signed a letter of intent for the joint development of the Storliden zinc/copper deposit owned by NAN and located in the Skellefte mineral district of northern Sweden. The deposit was estimated by NAN to contain 1.8 Mt of ore at an average grade of 10.3% zinc, 3.5% copper, and 24 grams per metric ton silver (Mining Journal, 2000a). The mine would have a 6-year life, with mining and processing estimated to be between 250,000 t/yr and 350,000 t/yr of ore, which would produce 25,200 t/yr of zinc and 11,200 t/yr of copper in concentrate. All ore mined would be delivered to Boliden Mineral's mill near Boliden and processed to produce zinc and copper concentrates. Commercial production was scheduled to begin in 2002. The cost of development of the deposit was estimated to be between $35 million and $50 million. The partners would share a calculated net smelter royalty on the concentrates produced—

two-thirds for NAN and one-third for Boliden Mineral. Boliden Mineral held a 38.3% interest in NAN, as did South Atlantic Resources of Canada (Mining Journal, 2000a). NAN received a mine permit for the Storliden project in March.

According to the company's interim report (January to June), ScanMining AB was confident about its Blaiken zinc/gold mine coming into operation. Production was expected to start in early 2001. The project included two zinc and gold mines in the Sorsele field and an ore dressing plant. About 2 Mt of ore with an average grade of 3% zinc was discovered in Svarttrask (ScanMining AB, 2000). Kvaerner Metals Davy completed a feasibility study of the proposed open cast mine.

Alcaston Diamond Exploration AB acquired 2 additional exploration licenses for diamonds of fluvial type in the Norbotten region of northern Sweden, bringing its total exploration holdings in the region to 16 granted licenses. The licenses were acquired from Geoforum Scandinavia AB by cash and an issue of shares in Alcaston. These licenses cover a total area of 1.53 million hectares. Approximately 300 targets were identified, of which 22 were of high priority, having geophysical signatures appropriate to kimberlite pipes. Approximately 160 samples were gathered during 1999. More detailed sampling would be required in the 2000 field season to give a valid evaluation of the diamond potential (Mining Journal, 2000b).

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Major Source of Information

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Mineral Resources Information Office
Skolgatan 4
93070 Mala, Sweden

TABLE 1
SWEDEN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 e/	2000 e/
METALS						
Aluminum metal:						
Primary		98,306	98,377	95,670	99,340 r/ 3/	100,800 3/
Secondary e/		24,000	24,000	25,000	25,000	26,000
Copper:						
Mine output, Cu content		71,660	86,640	73,685	71,200	75,600 3/
Metal:						
Smelter:						
Primary e/		100,000	95,000	90,000	85,000	95,000
Secondary e/		26,000	33,000	35,000	30,000	35,000
Total		126,000	128,000	125,000	115,000	130,000
Refined: e/						
Primary		100,000 r/	105,000 r/	100,000 r/	95,000 r/	105,000
Secondary		25,000 r/	23,000 r/	25,000 r/	20,000 r/	25,000
Total		125,000 r/	128,000 r/	125,000	115,000 r/	130,000
Gold:						
Mine output, Au content	kilograms	6,145	6,777	5,944	4,400	3,300 3/
Metal, primary 4/	do.	10,100 e/	10,000	9,000 e/	8,000	8,000
Iron and steel:						
Iron ore concentrate and pellets:						
Gross weight	thousand tons	21,020	21,893	20,930	18,558 3/	20,560 3/
Fe content	do.	13,453 r/	13,912	12,977	11,506 3/	12,747 3/
Metal:						
Pig iron and sponge iron	do.	3,255	3,060	3,373	3,212 3/	3,146 3/
Ferroalloys:						
Ferrochromium		138,110	101,842	123,958	131,140 3/	135,000
Ferrosilicon		21,287	22,409	20,356 r/	21,440 r/ 3/	20,000
Total		159,397	124,251	144,314 r/	152,580 r/ 3/	155,000

See footnotes at end of table.

TABLE 1--Continued
SWEDEN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 e/	2000 e/
METALS--Continued						
Iron and steel--Continued: e/						
Metal--Continued:						
Steel, crude	thousand tons	4,910	5,147	5,062	5,075 3/	5,227 3/
Semimanufactures, rolled	do.	4,457	4,545	4,485	4,400	4,500
Lead:						
Mine output, Pb content		98,800	108,600	114,430	116,300 3/	108,000 3/
Metal, refined:						
Primary		42,200	34,700	40,600	38,000	37,800
Secondary		41,900	51,500	52,000	48,000	45,000
Total refined		84,100	86,200	92,600	86,000	82,800
Molybdenum, oxide, roasted, Mo content e/		4,000	3,500	3,000	3,000	3,000
Nickel, metal, secondary e/		100	100	100	60	50
Selenium, elemental, refined		20	20 e/	20 e/	20	20
Silver:						
Mine output, Ag content	kilograms	271,866	304,048	299,051	284,100 3/	307,400 3/
Metal, primary 4/	do.	301,000	300,000 e/	250,000 e/	250,000	250,000
Zinc, mine output, Zn content		160,325	155,400	164,711	174,400 r/ 3/	176,200 3/
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	2,447	2,253	2,105	2,100	2,150
Clays, kaolin e/	do.	460	450	450	450	440
Feldspar, salable, crude and ground		45,000	50,000	45,000	45,000	45,000
Fertilizer, manufactured: e/						
Nitrogenous	thousand tons	400	400	400	400	400
Phosphatic	do.	10	10	10	10	10
Mixed	do.	300	300	300	300	300
Graphite		463	1,470	3,011	4,500 r/	5,000
Lime e/	thousand tons	540	600	500	500	550
Quartz and quartzite e/	do.	525	500	500	500	500
Stone: e/						
Dimension:	do.					
Mostly unfinished		160	150	150	150	160
Granite	thousand tons	100 3/	100	100	100	90
Limestone	do.	5	5	5	5	5
Slate	do.	20	20	20	20	20
Other	do.	10 3/	10	10	10	10
Crushed:						
Dolomite	do.	600	600	600	600	700
Granite	do.	3,500 3/	3,500	3,500	3,500	3,500
Limestone:						
For cement manufacture	do.	4,000	4,000	4,000	4,000	4,000
For lime manufacture	do.	1,000	1,000	800	800	800
For other construction and industrial uses	do.	2,000	1,800	1,600	1,600	1,600
Chalk	do.	25	30	30	30	30
For agricultural uses	do.	475 3/	400	400	400	450
For other uses	do.	1,000	1,000	1,000	1,000	1,000
Total	do.	8,500	8,230	7,830	7,830	7,880
Sandstone	do.	100	100	75	75	75
Undifferentiated	do.	25,000	25,000	25,000	25,000	30,000
Other	do.	500	500	500	500	500
Sulfur, byproduct: e/						
From metallurgy	do.	67 r/	71 r/	73	65	91
From petroleum	do.	50 r/	62 r/ 3/	63	55	60
Total	do.	117 r/	133 r/	136	120	151
Talc, soapstone e/		30,000	25,000	25,000	25,000	26,000
MINERAL FUELS AND RELATED MATERIALS						
Coke, metallurgical	thousand tons	1,145	1,200 e/	1,150 e/	1,200	1,200
Gas, manufactured: e/						
Coke oven gas	million cubic meters	500	500	500	500	500
Blast furnace gas	do.	3,500	3,500	3,500	3,500	3,500
Peat:						
Agricultural use	thousand cubic meters	1,084	1,100	670	1,460 r/ 3/	1,500
Fuel	do.	2,278	2,400	390	2,652 r/ 3/	1,372 3/

See footnotes at end of table.

TABLE 1--Continued
SWEDEN: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999 e/	2000 e/
MINERAL FUELS AND RELATED MATERIALS--Continued:						
Petroleum, refinery products: e/						
Liquefied petroleum gas	thousand 42-gallon barrels	3,500	3,500	3,000	3,000	3,000
Naphtha	do.	500	500	500	500	500
Gasoline, motor	do.	32,500	36,932 3/	38,862 3/	38,000	39,000
Jet fuel	do.	2,500	1,872 3/	1,288 3/	1,400	1,500
Kerosene	do.	50	50	50	50	50
Distillate fuel oil	do.	75,000	53,152 3/	56,582 3/	56,000	57,000
Residual fuel oil	do.	25,000	35,304 3/	38,508 3/	38,000	39,000
Other	do.	3,000	7,714 3/	7,800	7,800	7,800
Refinery fuel and losses	do.	5,000	5,000	5,000	5,000	5,000
Total	do.	147,000	144,000	152,000	150,000	153,000

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through August 14, 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reported figure.

4/ Includes only that recovered from indigenous ores excluding scrap.

TABLE 2
SWEDEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operatin companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Granges AB (Glencore International AG, 100%)	Sundsvall smelter at Kubikenborg	100
Cement		Cementa AB (Scancem, 100%)	Plants at Degerhamn, Skövde, and Slite	3,400
Copper:				
Ore, copper content		Boliden Mineral AB	Mines at Aitik, Garpenberg, Kankberg, Kristineberg, Langdal, Petiknas, and Renstrom	68
Do.		Outokumpu Oyj	Mines at Viscaria (closed)/Pahtohavare	22
Metal		Boliden Mineral AB	Smelter and refinery at Rönnskär	240
Feldspar		Berglings Malm & Mineral AB (Omya GmbH)	Mines at Beckegruvan, Hojderna, and Limbergsbo	50
Do.		Forshammar Mineral AB (Omya GmbH)	Mines at Limberget and Riddarhyttan	30
Do.		Larsbo Kalk AB (Omya GmbH)	Mines at Glanshamar and Larsbo	20
Ferroalloys		Vargon Alloys AB	Plant at Vargon	175
Gold:				
Ore, gold content	kilograms	William Resources Inc.	Björgdal Mine at Skellefta	3,000
Do.	do.	Boliden Mineral AB	Mines at Aitik, Akerberg, Kankberg, Kristineberg, Langdal, Petiknas, and Renström	2,000
Metal		Boliden Metals AB	Smelter and refinery at Rönnskär	9
Graphite		Woxna Graphite AB (Tricorona Mineral AB, 100%)	Mine and plant at Kringeltjärn, Woxna	20
Iron ore		Luossavaara-Kiirunavaara AB (Government, 98%)	Mines at Kiruna and Malmberget	28,500
Iron and steel		Svenskt Stal AB (Government, 48%)	Steelworks at Borlänge, Luleå, and Oxelosund	3,500
Kyanite		Svenska Kyanite AB (Svenska Mineral AB, 100%)	Quarry at Halskoberg	10
Lead:				
Ore, lead content		Boliden Mineral AB	Mines at Garpenberg, Laisvall, Langdal, Petiknas, and Renström	110
Do.		North Mining Svenska AB	Zinkgruvan Mine at Ammeberg	20
Metal		Boliden Metals AB	Smelter and refinery at Rönnskär	115
Lime		Euroc Mineral AB	Plants at Limham, Koping, and Storugns	250
Do.		Svenska Mineral AB	Plants at Rattvik and Boda	250
Limestone		Kalproduction Storugns AB (Nordkalk AB, 100%)	Mines at Gotland Island	3,000
Marble	cubic meters	Borghamnsten AB	Quarry at Askersund	15,000
Petroleum, refined	barrels per day	Skandinaviska Raffinaderi AB	Refinery at Lysekil	210,000
Do.	do.	BP Raffinaderi AB	Refinery at Goteborg	100,000
Do.	do.	Shell Raffinaderi AB	do.	82,000
Do.	do.	AB Nynas Petroleum	Refineries at Goteborg, Malmo, and Nynashamn	54,000
Silver, metal	kilograms	Boliden Metals AB	Smelter and refinery at Rönnskär	300,000
Do.	do.	North Mining Svenska AB	Zinkgruvan Mine at Ammeberg	25,000
Zinc, ore, zinc content		Boliden Mineral AB	Mines at Garpenberg, Laisvall, Langdal, and Renström	112
Do.		Zinkgruven Mining AB (North Ltd., 100%)	Zinkgruvan Mine at Ammeberg	60

THE MINERAL INDUSTRY OF

SWITZERLAND

By Harold R. Newman

The reserves of the small deposits of metalliferous ores that existed in Switzerland have long since been depleted and metal mining has ceased. Current mineral production was limited mainly to commodities required for construction, including cement, clays, gravel, gypsum, lime, and sand (table 1). The mineral industry is largely controlled by the Government and is owned either privately or by regional governments (cantons) (table 2). The 26 regional or communal governments grant mining or processing licenses and directly operate electrical generating facilities, water resources, gas utilities, and local transportation facilities.

Metal processing was confined to the production of primary and secondary aluminum, secondary lead, and steel. All metal production in Switzerland was either from imported raw materials or from scrap. Switzerland relied on imports for many mineral commodities, because of self-imposed environmental restrictions and lack of natural resources. Concerns about environmental pollution reportedly caused the adoption of a policy to gradually curtail or perhaps even cease smelting activities.

More than one of every two francs earned by the Swiss economy comes from abroad. Switzerland was among the leading exporters for both services (fifth ranking) and goods (ninth ranking) in the world. The country was a major trading partner of the European Union (EU), being the third largest supplier to the EU after the United States and Japan. At the same time, it was the EU's second largest importer after the United States. Other major EU trading partners, in declining order of importance, were Germany, France, and the United Kingdom (U.S. Department of State, Bureau of European Affairs, 2000, p. 6). Tables 3 and 4 list exports, including reexports, and imports, respectively, of selected mineral commodities by Switzerland in 1998 (the latest year for which data are available).

The merger between Alusuisse Lonza Group (algroup) (a global leader in flexible and speciality packaging) and Alcan Aluminum Ltd. of Canada was completed in 2000 and resulted in a $12.4 billion company with operations in the aluminum and packaging industries (Northern Miner, 2000).

A secondary lead smelter produced antimonial and calcium lead and a small amount of soft solder in bars from recycled batteries. The steel industry in Switzerland was characterized by a relatively small domestic market and a high degree of specialization (table 2).

The Swiss National Bank (SNB) intended to sell an initial 120 metric tons (t) of gold in 2000. The SNB was a large holder of gold and had 2,590 t in reserve. The sale was in line with the Washington agreement, which was signed by 15 European banks in September 1999. The agreement was to provide for orderly sales of central bank gold to minimize disruption of the gold market. The Swiss Finance Ministry announced that the country would officially abandon the gold standard on May 1, 2000, when its new currency law came into force. The SNB determined that it had 1,300 t of gold more than required under the terms of the new law and planned to dispose of the surplus gold over a 5-year period (Metal Bulletin, 2000).

Petroplus International NV of Belgium acquired Royal Dutch/Shell's Reffinerie de Cressier SA at Cressier for $130 million. Along with a 100% interest in the 68,000 barrel-per-day plant, Petroplus also acquired storage depots in Switzerland with a combined capacity of 5.5 million barrels and Shell's stake in the pipelines that supply the refinery (Oil & Gas Journal, 2000).

Switzerland is a large diamond center and was actively involved in cutting and polishing diamonds. The country played a big role in international trade activities, although it has no diamond mines and the main diamond centers are in Antwerp, Belgium; London, United Kingdom; and Tel Aviv, Israel. Tables 3 and 4 list the destinations and sources of the country's diamonds in 1997 and 1998, the latest years for which data are available.

Switzerland imported $900 million and exported $510 million worth of raw diamonds in 1999, the latest year for which data are available. Destinations and sources were not identified (Ruters Ltd., December 22, 2000, Press release, accessed December 29, 2000, at URL http://www.woza.co.za.ruters/dec00/diamonds22.htm).

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TABLE 1
SWITZERLAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Thousand metric tons unless otherwise specified)

Commodity 2/		1996	1997	1998	1999	2000
METALS						
Aluminum:						
Primary	metric tons	26,592 3/	27,339 3/	32,062 3/	34,439 r/ 3/	35,000
Secondary	do.	6,000	6,000	6,000	15,000	15,000
Iron and steel:						
Pig iron		100	100	100	100	100
Steel, crude		854 r/ 3/	1,047 r/ 3/	1,018 r/ 3/	1,037 r/ e/	1,140
Semimanufactures, rolled products		700	700	700	700	700
Lead, refined, secondary	metric tons	6,200	6,000 r/	7,600 r/	7,000 r/	8,000
INDUSTRIAL MINERALS						
Cement, hydraulic		3,638 r/ 3/	3,568 r/ 3/	3,600	3,600	3,600
Gypsum		300	300	300	300	300
Lime		35	35	35	30	30
Nitrogen, N content of ammonia		32 r/	32 r/	31 r/	32 r/	33 3/
Salt		300	300	300	300	300
Sulfur, from petroleum refining	metric tons	5,000 r/	5,000	4,000 r/	3,000 r/	3,000
MINERAL FUELS AND RELATED MATERIALS						
Petroleum refinery products:						
Liquefied petroleum gas	thousand 42-gallon barrels	2,000	2,000	2,000	2,000	2,000
Gasoline	do.	9,000	9,000	9,000	9,000	9,000
Jet fuel	do.	2,000	2,000	2,000	2,000	2,000
Distillate fuel oil	do.	9,500	9,500	9,500	9,500	9,500
Residual fuel oil	do.	5,500	5,500	5,500	5,500	5,500
Bitumen	do.	800	800	800	800	800
Refinery fuel and losses	do.	2,000	2,000	2,000 r/	2,000 r/	2,000
Total 4/	do.	30,800	30,800	30,800	30,800	30,800

r/ Revised.

1/ Table includes data available through March 2001.

2/ In addition to the commodities listed, a variety of crude construction materials (common clay, sand and gravel and stone) were produced, but output was not reported, and available general information was inadequate to make reliable estimates of output level.

3/ Reported figure.

4/ Total of listed products only.

TABLE 2
SWITZERLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Alusuisse-Lonza Holding AG (Alcan Aluminum Ltd., 50%)	Smelter at Stag	48
Cement		Bundr Cementwerke AG (Holderbank Management and Consulting Ltd., 100%)	Plant at Untervaz	700
Do.		Cementfabrik Holderbank AG	Plant at Rekingen	700
Lead, secondary		Metallum AG	Smelter at Pratteln	13
Refinery, petroleum	barrels per day	Reffinerie du Sud-Ouest SA (Compagnie Francaise des Petroles, 49%; and British Petroleum, 49%)	Refinery at Collombey	40,000
Do .	do.	Reffinerie de Cressier SA (Petroplus International NV, 100%)	Refinery at Cressier	68,000
Salt		Zentralbureu des Vereins der Schweizerischen Rheinsalinen (Government, 100%)	Saline at Schweizerhalle	350
Do .		La Societe des Mines (Canton of Vaud, 100%)	Saline at Bex	50
Steel		Stahl Gerlafingen AG (Swiss Steel AG, 100%)	Plant at Gerlafingen	650
Do .		Von Moss Stahl AG (Swiss Steel AG, 100%)	Plant at Emmenbrucke	300

TABLE 3
SWITZERLAND: EXPORTS OF DIAMOND

(Thousand dollars)

Destinations	1997	1998
Sorted, unworked or simply sawn, cleaved, or bruted:		
Israel	570,105	305,472
South Africa	46,606	NA
United Kingdom	221,236	NA
Total	847,036	326,879

NA Not available.

Source: Basel Magazine, April 1999, no. 1, p. 141, London, United Kingdom.

TABLE 4
SWITZERLAND: IMPORTS OF DIAMOND

(Thousand dollars)

Sources	1997	1998
Natural rough, unsorted, and sorted, unworked or simply sawn, cleaved, or bruted:		
Israel	14,106	NA
South Africa	NA	NA
United Kingdom	977,821	1,293,426
Total	1,224,940	1,340,129

NA Not available.

Source: Basel Magazine, April 1999, no. 1, p. 141, London, United Kingdom.

THE MINERAL INDUSTRY OF

THE UNITED KINGDOM

By Harold R. Newman

Mine production of ferrous and nonferrous metals in the United Kingdom has been declining for more than 20 years as reserves become depleted. Because metal processing has become the basis of a large and economically important mineral industry, imports were required to satisfy metallurgical requirements.

Operations in the steel sector showed moderate decreases as the demand for steel decreased. The industrial minerals sector has provided a significant base for expanding the extractive industries, and the balance has shifted away from the metallic mineral sector. Companies have a substantial interest in the production of domestic and foreign industrial minerals, such as aggregates, ball clay, china clay (kaolin), and gypsum (table 1).

Government Policies and Programs

The current statute regarding the development and working of mineral deposits is called the 1971 Act. This act consolidated all earlier planning legislation and has been amended by various statutes. Minerals were defined in section 209 of the 1971 Act to include all minerals and materials in or under land of a kind ordinarily worked for removal by underground or surface workings; it did not, however, include peat cut for purposes other than for sale. Mineral development was specifically addressed in the Town and Country Planning (Minerals) Regulations, 1971, and the Town and Country Planning (Minerals) Act, 1981.

Mineral rights to mineral fuels, such as coal, petroleum, and uranium, belong to the state. The Coal Authority was authorized to license open pit and underground mines to the private sector subject to restrictions on size and the payment of a royalty on the amount of coal produced.

Most other mineral rights in Great Britain are privately owned. The exceptions are gold and silver, the rights to which are vested in the Royal Family and are referred to as "Crown Rights." A different situation regarding mineral rights applies to Northern Ireland where, under the Mineral Development Act (Northern Ireland), 1969, the right to work minerals and the right to license others to do so are vested in the state.

Production

The Department of Trade and Industry (DTI) ensures a continuing supply of minerals for the country's industry and oversees mineral activities. Its areas of responsibility are all nonfuel minerals, which include all metallic ores and such industrial minerals as barite, china clay (kaolin), fluorspar, high-grade limestone, potash, salt, and silica sand. The industrial minerals sector, in particular, was important to the Nation's economy.

Through its Metals and Minerals Branch, the DTI is responsible for mineral fuels, which include coal, natural gas, and petroleum, and for issuing licenses for the exploration, appraisal, and production of natural gas and petroleum. These activities had previously been overseen by the Department of Energy (DOE).

In 2000, the DOE remained responsible for the minerals that were used in the construction industry. These included aggregates, brick and brick clay, cement and its raw materials, dimension stone, gypsum for plaster, and sand and gravel. State and privately owned corporations produced minerals and mineral-based products. State ownership was mostly in the nuclear power industry (table 3).

The United Kingdom was entering its seventh consecutive year of economic expansion, although growth slowed in concert with other European Union (EU) countries. Real gross domestic product growth was expected to remain below 2% in 2000. The indices of industrial production are listed in table 2.

The country's economy is largely shaped by market forces, with independent regulatory bodies providing additional direction in those sectors where private individuals are the principal users of the product or service. Government initiatives include continued privatization, deregulation, and support for competition. Government policy is still evident, however, in some areas, such as favoring coal over gas for electric power generation (U.S. Embassy, London, United Kingdom, 2000, p. 32).

Commodity Review

Metals

Aluminum.—Of the four primary aluminum smelters in the United Kingdom, three were owned and operated by British Alcan Aluminium Ltd. (the United Kingdom subsidiary of Montreal-based Alcan Aluminium Ltd). The fourth smelter [owned by Rio Tinto Ltd. (51%) and Kaiser Aluminum and Chemical Corp. of the United States (49%)] was operated by Anglesey Aluminium Ltd. All the aluminum smelters depended on imported alumina for feedstock.

British Alcan announced it was going to close the Kinlochleven aluminum smelter in Scotland by yearend 2000. The plant began operation in 1907 with an original capacity of 11,000 metric tons per year (t/yr) but was producing only about 7,000 t/yr. British Alcan was planning to improve output at the two other smelters to 160,000 to 170,000 t/yr at Lynemouth and to 46,000 to 47,000 t/yr at Lochhaber by 2010 (Mining Journal, 2000b).

The secondary aluminum metal industry treats recycled aluminum and low-grade aluminum scrap, such as swarf. The main consuming sector for secondary aluminum ingots was the automotive industry. The secondary aluminum industry was going through a difficult period as profit margins continued to be squeezed between high scrap prices and low ingot prices. The pressure on scrap, particularly pure grades as those of the London Metal Exchange primary contract, rose to more than $1,600 per metric ton and led to higher prices. Higher scrap prices, however, did not translate into higher ingot prices. Some smelters were trying to take a stand on ingot prices and move them up to realistic levels to cover the cost of the scrap. Smelters might shut down more capacity or sell noncore assets to survive and pay down debt (Metal Bulletin, 2000a).

In 2000, Brent Smelting Works announced that it was closing. The company stated that it felt the secondary aluminum ingot business would be led by one or two major players in the United Kingdom and that a company its size was not in keeping with that. The smelter, which was founded in 1940, is close to the M1 motorway, and the site has a high property value. The site will be leased out to a property management firm, and income from this is expected to be higher than the income the company earned from secondary aluminum smelting (Metal Bulletin, 2000b).

Copper.—Billiton plc of the United Kingdom and the Chilean state-owned copper producer Corporación Nacional del Cobre de Chile (Codelco) agreed to form a joint venture to apply Billiton's patented copper bioleaching technology (BioCOP®) on a commercial basis. The two companies worked together on BioCOP® for 3 years with pilot plants at Billiton's research facilities and Codelco's Chuquicamata division. The BioCOP® process takes a flotation concentrate from the treatment of primary copper ore and bioleaches the contained copper into a slurry that contains soluble copper sulfate. The bioleaching takes place in stirred tanks and dissolves the copper in the process. The separated copper sulfate-rich slurry then is subjected to the solvent extraction-electrowinning (SX-EW) process to produce copper cathode (Mining Journal, 2000a).

Iron.—Production of iron ore was limited to a small amount of hematite ore mined by Egremont Mining Co. at the Florence Mine in Cumbria. The output went for pigments and foundry annealing uses rather than metal production.

Steel.—Corus Group, which had been created in 1999 by the merger of British Steel plc. and Koninklijke Hoogovens NV of the Netherlands, was the fifth largest steel producer in the world in 2000 after Pohang Iron and Steel Co. of the Republic of North Korea, Nippon Steel Corp. of Japan, Arbed Group of Luxembourg, and Usinor Group of France. Although traditional ingot casting was still used in the manufacture of certain grades of steel, most of the output was by means of continuous casting. Corus was also Europe's top tinplate producer with production of about 1.5 million metric tons per year (Mt/yr) (Metal Bulletin, 2001).

Tin.—The South Crofty Mine in the county of Cornwall, which was the last United Kingdom producing tin mine, was acquired by Baseresult Ltd., which bought the 8.6 million shares of South Crofty Holding Ltd. The mine could be reopened. South Crofty had been allowed to flood when it was closed in March 1998. Pumping water from the mine was to begin in 2001. The cost of returning the mine to its preclosure state was estimated to be more than $3 million. The Wheal Jane plant's processing equipment would be transferred because the focus of operations would be the South Crofty Mine itself. Attempts to get Government funding to assist in reopening the mine failed (Metal Bulletin, 2000c).

The only remaining tin mining activity in the area was a very small scale production of cassiterite by a tourist operation, which smelted the ore onsite to produce metallic tin for jewelery and ornaments.

Industrial Minerals

Cement.—The United Kingdom's two largest cement producers were Blue Circle Industries plc. (BCI) and Castle Cement Ltd. The third producer was Rugby Group. BCI had 10 plants, which included 1 in Northern Ireland. Castle had four plants, including one grinding plant. Rugby had six plants (table 3).

BCI sold its 50% interest in Aalborg Portland A/S of Denmark to Aalborg Portland Holding, a Danish materials group, for $120 million. BCI, which fought off a $5.5 billion hostile takeover bid from Lafarge of France in May 2000, was fulfilling part of the promises made to shareholders in its defense document. BCI was also planning to sell its North American aggregates business (Croft, 2000).

Clay.—The United Kingdom was a leading world producer and exporter of ball clay and china clay (kaolin). Watts, Blake, Bearne & Co. plc (WBB) was the country's largest producer of ball clay. English China Clays Plc. was the largest producer of china clay and one of the major producers worldwide. Operations were mainly in the southwestern area of the United Kingdom.

ECC International Ltd. operated ball clay and kaolin mines and quarries in the Wareham Basin, Dorsetshire, the Bovey Basin, south Devonshire, and the Petrockstowe Basin, north Devonshire. A majority of the production was from the Bovey Basin.

Gypsum.—British Gypsum Ltd. (a subsidiary of BPB Industries Plc.) was the major producer of gypsum in the United Kingdom. The company had mines in Cumbria, Leicestershire, Nottinghamshire, Staffordshire, and Sussex that produced about 1.5 Mt/yr of gypsum. With few exceptions, this material went to supply the domestic market.

Potash.—Cleveland Potash Ltd. (CPL), which was the only potash producer in the United Kingdom, operated the Boulby Mine in Yorkshire. CPL also mined rock salt as a coproduct from an underlying seam in the Boulby Mine. The seam of potash extends out under the North Sea and occurs at depths of between 1,200 and 1,500 meters (m) in a seam that ranges up to 20 m but averages 7 m in thickness. Within a Permian evaporite sequence, silvinite ore comprises 35% to 45% sylvite and 45% to 55% halite plus impurities. The sedimentary strata above the evaporites include the Triassic Sherwood sandstone, which contains brine under high pressure. During extraction, pressured gas will occasionally cause blowouts in the shaly parts of the potash (Cleveland Potash Ltd., 2000, Boulby—Potash mine, accessed March 12, 2001, at URL http://www.mining-technology.com/projects/boulby/index.html).

Silica, sand.—In July, WBB announced the acquisition of Hepworth Minerals and Chemicals (Holdings) Ltd. (HMC) for $120 million. This brought the United Kingdom's largest producer of silica sand into WBB Group. HMC has extensive mineral reserves and operates in the United Kingdom, continental Europe, and the Asia-Pacific region. There are 12 operating sites in the United Kingdom. WBB is a world leader in raw materials for the ceramics industry (WBB, 2000, WBB Group acquires Hepworth Minerals and Chemicals, accessed January 3, 2001, via URL http://www.WBB.co.uk/wbbhtm/press_release.htm).

Slate.—Most slate mining in the United Kingdom was in northern Wales; additional mining operations were in Cornwall and the Lake District. Alfred McAlpine Slate Ltd. was the owner and operator of the Cwt y Bugail, the Ffestiniog, and the Penrhyn quarries in northern Wales. The Penrhyn quarry at Bethesda measured 2,415 m by 805 m and was considered to be the world's largest slate quarry; it has been in operation for more than 400 years. The company also produced slate from its quarry in the United States through Hilltop Slate Inc., New York. Historically, slate has been used in roofing applications, but in more recent times, markets have been extended to include interior flooring and window sills, as well as ornamental landscapes. McAlpine Slate produced more than one-half of the United Kingdom's entire production of natural slate. The company exported about two-thirds of its production, mostly to Europe (Alfred McAlpine Slate Ltd., 2000, About us, accessed November 29, 2000, at URL http://www.amslate.com/about.shtml).

Mineral Fuels

Coal.—At the end of March, the Coal Authority had in place operating or conditional mining licences for 82 underground and 328 open pit mines, together with 10 coalbed methane agreements. There were also 496 coal exploration licences. The Coal Authority estimated that under existing licences, there were operating licence coal reserves of 435 million metric tons (Mt) underground and 25 Mt open pit, with conditional licence coal reserves of 82 Mt underground and 230 Mt open pit, and closed (where mining has ceased but licence is still valid) 120 Mt underground, 4 Mt open pit. In 2000, the coal industry of England had a work force of 9,700 that produced 24.1 Mt; in Scotland, a work force of 2,200 produced 8.2 Mt; and in Wales, a work force of 1,100 produced 2.1 Mt (Mining Journal, 2000d).

Most of the coal mining industry was owned by RJB Mining plc., which was the largest coal mining company in the United Kingdom and the largest independent coal producer in the EU. RJB operated 13 underground and 15 open pit mines, which sold a total of 22.5 Mt in 1999. The largest operation was the underground Selby Complex, which consisted of Riccall/Whitmoor, Stillingfleet Combine, and Wistow (Mining Journal, 2000d).

This biggest part of the United Kingdom's coal mining industry was expected to be acquired by Renco Group of the United States. If the $158 million deal is finalized with RJB, then it could end subsidies from United Kingdom taxpayers and could also mean the loss of a few thousand jobs in the mining industry. Renco was interested in RJB for the value of its land as much as for its mining capability. RJB has an extensive portfolio that covers about 20,000 hectares, acquired with its mines from the formerly state-owned British Coal (Mining Journal, 2000d).

In early 2000, Midlands Mining plc ceased to produce coal from its only remaining colliery, Annesley-Bentinck (Department of Trade and Industry, 2000).

The international and independent energy company EuroGas Inc. entered into an agreement with Slovgold GesmbH of Austria to conduct a six-well pilot program, that would comprise 500 square kilometers in south Wales to test for coalbed methane gas. If the program is successful, then an additional 10 wells would be drilled. The potential for methane gas production from the south Wales coalfield that underlies the acreage was considered to be significant. There was vent gas production in the area where consistent flow rates of high-purity methane gas have been obtained; vent gas refers to gas produced from abandoned mine shafts. Because southern Wales is the highest demand area and is the most remote from North Sea gas production in the United Kingdom, local gas prices are the highest in the United Kingdom. Accordingly, local gas production has emerged as a competitive gas source for power generation (EuroGas Inc., January 20, 2000, EuroGas enters United Kingdom coalbed methane project, accessed January 22, 2000, at URL http://biz.yahoo.com/prnews/000120/eurogas_uk_1.html).

RJB and Texaco (UK) Ltd. announced plans for a joint study to explore the possibility of developing the United Kingdom's first large-scale state-of-the-art "clean coal" powerstation on a site adjacent to RJB's Kellingley Colliery in West Yorkshire. The 400-megawatt Kellingley station would incorporate clean-coal technology, which has a proven track record for efficiency and emission-reduction performance. It would consume about 1 Mt/yr, which was half the planned annual output of the Kellingley Colliery (RJB Mining Plc., [2000], A profile of RJB Mining Plc., accessed November 29, 2000, at URL http://www.rjb.co.uk/docprof.htm).

Natural Gas and Petroleum.—The offshore United Kingdom sector of the 36-year-old North Sea oilfield continued to be significant in international petroleum and natural gas activities. As a result, the country has become a headquarters for international oil companies and a major energy supplier to other countries.

After completion of the 18th round of offshore licensing in June 1998, no further offshore licensing rounds have been announced.

As a result of the May 2000 ninth round of onshore licensing, 21 companies were awarded 37 licenses for petroleum and natural gas exploration. Almost half of the 123 blocks licensed were for the exploration of coalbed methane and mine gas. Further licenses were expected to be awarded (Alexander's Gas and Oil Connections, August 18, 2000, UK Energy Minister awards 37 licences to 21 companies for oil and gas, accessed August 21, 2000, at URL http://www.gasandoil.com/goc/news/nte03393.htm).

Exploration for petroleum on the Falkland Islands Continental Shelf is governed by Falkland Islands law. These provisions are independent of the United Kingdom laws and regulations, although there are many similarities to the United Kingdom North Sea regime. The North Falkland Basin was the location of the drilling activity. The basin comprises two main structural elements—a north-south-trending graben called the North Falkland Graben and a set of subsidiary basins to the west of the graben that are also controlled by north-south-trending extensional faults but constrained by northwest-southeast-oriented reactivated Paleozoic thrust sheets. The North Falkland Graben is subdivided, in its northern part, into western and eastern depocenters that are separated by a pervasive north-south-trending intragrabenal high. The graben is about 50 kilometers (km) wide at its northern end and about 30 km wide at its southern margin, and a length of about 230 km long has been mapped. It lies directly north of the Falkland Islands (Falkland Islands Government, 2000, Offshore oil exploration, accessed March 4, 2001, at URL http://www.falklands.gov.fk/oildept2.htm).

Data from six wells drilled in the North Falkland Basin were analyzed by the companies involved and the British Geological Survey (BGS). Although no commercially viable accumulations of oil were found, some evidence of gas and minor quantities of oil were found at five of the six wells, and one of the wells flowed live oil to surface. Even though large accumulations of oil were not found, the BGS suggested that was because all the wells targeted potential oilfields above the source rock, whereas new geologic modeling suggests that it would be better to look beneath the source rock (Falkland Islands Government, 2000, Falkland Islands offshore oil exploration, accessed May 14, 2001, at URL http://www.falklands.gov.fk/9bg.htm).

There was no evidence that the Falkland Islands contained metalliferous minerals of economic value. It is possible, however, that there could be suitable graded deposits of silica sand for glass manufacture. The only local fuel was peat (Falkland Islands Government, 2000, Minerals, accessed April 4, 2001, at URL http://www.falklands.gov.fk/10h.htm).

Outlook

In the United Kingdom and Europe, transportation changed significantly with the completion and operation of the Channel Tunnel. The tunnel, which is referred to as the "Chunnel," was constructed underneath the English Channel and connects Folkestone, England, and Coquelles, near Calais, France. Everything transported through the tunnel moves by rail. The trip takes about 30 minutes. The Channel Tunnel was a vital component of the European single-market concept.

The United Kingdom is a significant player in the world mining and mineral-processing industries. This is more the result of an extensive range of companies in the country that have various interests in the international mineral industry rather than the domestic mineral industry. This situation is expected to continue.

Exploration for petroleum and natural gas is expected to continue onshore and offshore. Onshore exploration activities will be directed mainly toward precious metals, mainly gold. Offshore petroleum and natural gas exploration interest will continue to be focused on North Sea areas, particularly in the areas west of the Shetland Islands, the central North Sea, and the Southern Gas Basin of the North Sea.

The DTI is expected to continue to be involved in the development of mineral resources. Efforts to raise the level of environmental management and to maximize the best use of natural resources, which will include use of recycled materials and alternate sources of energy, will continue.

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TABLE 1
UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000 e/
METALS						
Aluminum:						
Alumina from imported bauxite e/		99,000	100,000	96,000	90,000	100,000
Metal:						
Primary		239,963	247,675	258,397	272,211	305,100 3/
Secondary		257,200	257,800	236,000 e/	274,800	285,300 3/
Cadmium, metal including secondary		541	455	440 e/	547	500
Copper, metal, refined:						
Primary		12,869	9,000 e/	7,000	--	1,000
Secondary		43,746	51,402	47,774	50,334	49,000
Total		56,615	60,402	54,774	50,334	50,000
Iron and steel:						
Iron ore:						
Gross weight		1,180	1,210	1,188	1,000 e/	1,033 3/
Fe content (54% Fe)		637	653	642	568 e/	540
Metal:						
Pig iron	thousand tons	12,830	13,057	12,569	12,399	10,989 3/
Steel, crude	do.	18,220	18,528	17,007	16,634	15,306 3/
Steel, hot rolled	do.	18,869	16,149	15,214	14,334 r/	12,783 3/
Lead:						
Mine output, Pb content e/		1,800	1,800	1,800	1,000	1,000
Metal:						
Smelter:						
Bullion from imported concentrate		41,991	38,500 e/	37,927	40,177	36,700 3/
Secondary (refined) e/ 4/		100,000	100,000	100,000	100,000	100,000
Total e/		142,000	139,000	138,000	140,000	137,000
Refined:						
Primary 5/		168,108	215,243	186,212	185,422	166,411 3/
Secondary 4/		177,466	175,783	163,492	162,651	170,740 3/
Total		345,574	391,026	349,704	348,073	337,151 3/
Magnesium, metal, secondary including alloys e/		1,000	1,000	1,000	500	500
Nickel, metal, refined 6/		38,561	36,586	41,994	39,467	37,976 3/
Tin:						
Mine output, Sn content		2,103	2,396	400 e/	--	--
Metal, secondary (refined) e/		100	--	--	--	--
Zinc, metal, smelter		96,867	107,704	99,600	132,800	99,600 3/
INDUSTRIAL MINERALS						
Barite e/ 7/		102,000 3/	74,000	68,000	59,000 r/	55,000
Bromine		30,600	35,600 r/	35,900 r/	55,000 r/ e/	50,000
Cement, hydraulic	thousand tons	12,214	12,638	12,409	12,900 e/	12,500
Clays:						
Fire clay	do.	536	338	500 e/	575 e/	500
Fuller's earth 8/	do.	143	135	95 e/	75 e/	70
Kaolin (China clay) 9/	do.	2,281	2,360	2,392	2,304	2,420 3/
Ball clay and pottery clay 9/	do.	866	916	960 e/	985 e/	1,000
Other, including shale e/	do.	13,000 3/	12,000	10,000	12,500	12,000
Feldspar (china stone) e/		8,000	8,000	3,278 3/	3,000	2,000
Fluorspar, all grades e/ 10/		65,000 3/	67,000	65,000	40,000	35,000
Gypsum and anhydrite e/	thousand tons	2,000	2,000	2,000	1,800	1,500
Lime, quicklime and hydrated e/	do.	2,500	2,500	2,500	2,500	2,500
Nitrogen, N content of ammonia	do.	850	642	871	901	814 3/
Potash, K_2O equivalent		618,000	564,500	608,400	494,700	500,000
Salt: e/						
Rock	thousand tons	1,800	1,800	700	1,500	1,700
From brine	do.	1,300	1,300	1,300	1,300	1,200
In brine, sold or used as such	do.	3,512 3/	3,561 3/	3,500	3,000	3,000
Sand and gravel:						
Common sand and gravel	do.	96,377	99,800 e/	98,315	96,000 e/	98,000
Industrial sand	do.	4,816	4,800 e/	4,662	4,600 e/	4,500
Sodium compounds, n.e.s, carbonate e/	do.	1,000	1,000	1,000	1,000	1,000

See footnotes at end of table.

TABLE 1--Continued
UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1996	1997	1998	1999	2000 e/
INDUSTRIAL MINERALS--Continued					
Stone:					
Crushed:					
Calcite e/ thousand tons	--	13 r/	15	-- r/	--
Chalk do.	9,239	9,550	9,934	10,000 e/	10,000
Dolomite do.	16,555	18,282	15,622	13,698 r/	14,000
Igneous rock do.	50,705	48,656	45,807	43,000 e/	50,000
Limestone do.	86,342	87,752	88,979	86,933 r/	86,000
Sandstone do.	17,251	18,499	20,129 r/	15,485 r/	15,000
Slate including fill do.	408	347	450	425 r/	350
Total do.	180,500	183,099 r/	180,936 r/	169,541 r/	175,000
Dimension: e/					
Igneous do.	100	100	138	140	125
Limestone do.	222	225	225	295	300
Sandstone do.	271	275	287	290	300
Slate do.	83	85	69	70	70
Sulfur, byproduct: e/					
Of metallurgy	44,700	39,200	40,500	26,600 3/	51,400 3/
Of petroleum refining	132,000	137,000	184,000	136,000	140,000
Total	177,000	176,000	225,000	162,600	191,400
Talc, soapstone, and pyrophyllite	5,322	5,500 e/	4,937	5,000 e/	5,000
Titania e/ 11/	233 3/	200	200	200	200
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite e/ thousand tons	1,000	1,000	1,000	1,000	797 3/
Bituminous including slurries, fines, etc. do.	50,515	46,981	40,272	36,450	31,175 3/
Lignite do.	2	1	1	--	--
Total e/ do.	51,500	48,000	41,300	37,500	31,972 3/
Coke: e/					
Metallurgical	6,220 3/	6,178 3/	6,178 3/	5,837 3/	6,058 3/
Breeze, all types	40	44	37 3/	33 3/	37 3/
Fuel briquets, all grades e/	796	814	616	635 3/	537 3/
Gas, natural:					
Marketable 12/ million cubic meters	89,900	91,800 e/	95,503	104,900	105,000
Marketed e/ 13/ do.	65,000 3/	66,000	68,000	70,000	70,000
Natural gas liquids 14/ thousand 42-gallon barrels	54,705	55,391	58,877	61,859	62,000
Peat cubic meters	1,885	1,619	1,076	1,000 e/	1,000
Petroleum:					
Crude 15/ thousand 42-gallon barrels	914,475	902,408	931,665	961,965	886,275 3/
Refinery products:					
Liquefied petroleum gases do.	22,875	24,232	25,265	24,406	25,000
Naphtha including white spirit do.	25,160	24,259	21,148	21,675	22,000
Gasoline do.	238,390	249,210	240,210	232,832	230,000
Jet fuel do.	66,440	66,763	63,536	59,032	60,000
Kerosene do.	27,203	25,854	26,900	27,714	28,000
Distillate fuel oil do.	215,616	214,684	207,828	195,280	195,000
Residual fuel oil do.	76,450	87,633	74,000	68,591	68,000
Lubricants do.	7,777	8,617	7,938	6,440	6,500
Bitumen do.	13,265	13,683	13,271	10,102	10,000
Petroleum coke do.	5,619	5,600	5,500	5,000 e/	5,000
Petroleum wax do.	323	325	350	472	400
Unspecified e/ do.	30,600	30,300	30,000	30,000	30,000
Refinery fuel and losses e/ do.	40,000	35,000	25,000	25,000	25,000
Total e/ do.	770,000	786,000	741,000	707,000	705,000

See footnotes at end of table.

TABLE 1--Continued
UNITED KINGDOM: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

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e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through May 2001.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ Reported figure.

4/ Includes a small quantity of primary lead from domestic concentrate.

5/ Produced entirely from imported bullion and includes the lead content of alloys.

6/ Refined nickel and nickel content of ferronickel.

7/ Includes witherite.

8/ Salable product.

9/ Sales, dry weight.

10/ Proportions of grades not available; probably about two-thirds acid grade.

11/ Sales.

12/ Methane, excluding gas flared or reinjected.

13/ Marketable methane, excluding that used for drilling, production, and pumping operations.

14/ Includes ethane, propane, butane, and condensates, respectively.

15/ Excludes gases and condensates.

TABLE 2
UNITED KINGDOM: SELECTED INDICES OF PRODUCTION

(1990 = 100)

Sector	1997	1998	1999	2000 e/
General	109	103	110	110
Mining	139	142	147	145
Manufacturing	104	105	105	105
Electricity and gas	122	124	126	127

e/ Estimated.

Source: United Nations, 2000, Monthly Bulletin of Statistics, v. LIV, no. 12, December, p. 34.

TABLE 3
UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aggregate	ARC Ltd. (Hanson Plc., 100%) and Foster Yeoman Ltd. Foster Yeoman Ltd.	50 quarries in various locations Glesanda quarry at Oban	50,000 15,000
Aluminum, primary	British Alcan Aluminium Ltd.	Fort William, Kinlochleven, and Lynemouth	175
Do.	Anglesy Aluminium Ltd. (Rio Tinto Corp., 51%; Kaiser Aluminium and Chemical Corp., 49%)	Holyhead, Wales	113
Aluminum, secondary	Trent Alloys Ltd. (Cookson Group, 100%)	North Cave, Humberside	30
Do.	Deeside Aluminium Ltd.	Clwyd, Wales	45
Ball clay	Watts, Blake, Bearne & Co. Plc.	Various operations in northern and southern Devon	500
Barite	Laporte Industries Plc.	Mines in Derbyshire	25
Celestite	Bristol Minerals Co. Ltd.	Yate, Avon	30
Cement	Aberthaw and Bristol Channel Portland Cement Co. Ltd.	East Aberthaw and Rhoose, Glamorgan	1,000
Do.	Blue Circle Industries Plc.	Plants at Aberthaw, Cauldon, Dunbar, Hope, Masons, Northfleet, Plymstock, and Weardale	7,300
Do.	Castle Cement Ltd. (Scancem, 100%)	Plants at Ketton, Ribblesdale, Pades, and Pitstone	3,400

TABLE 3--Continued
UNITED KINGDOM: STRUCTURE OF THE MINERAL INDUSTRY IN 2000

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement--Continued:	Rugby Group	Plants at Barrington, Chinnor, Rochester, Rugby, and South Ferriby	2,700
China clay (kaolin)	ECC Group Plc.	Mines and plants in Devonshire and Dorsetshire	3,000
Coal million metric tons	RJB Mining Plc.	19 mines in various locations	40
Copper	IMI Refiners Ltd.	Refinery at Walsall, west Midlands	80
Ferroalloys	British Steel Plc.	Teesside, Cleveland	80
Do.	Murex Ltd.	Rainham, Essex	25
Do.	London and Scandinavian Metallurgical Co. Ltd.	Rotherham, South Yorkshire	30
Fluorspar	Durham Industrial Minerals Ltd.	Mines in Weardale	50
Do.	Laporte Industries Plc.	Mill at Stoney Middleton, mines in Derbyshire	70
Gypsum	British Gypsum Ltd.	Mines in Cumbria, Nottinghamshire, and Sussex	3,500
Lead, refined	Britania Refined Metals Ltd.	Northfleet, Kent	165
Lead, secondary	H.J. Enthoven and Son Ltd. [Billiton (U.K.) Ltd., 100%]	Darley Dale, Derbyshire	60
Lead, smelter	MIM Holdings (U.K) Ltd.	Avonmouth, Avon	55
Natural gas billion cubic feet	Amoco Ltd. British Petroleum Ltd. Esso (U.K.) Ltd., Phillips Petroleum Co. Plc., Shell (U.K.) Ltd.	North Sea gasfields	1,250
Nickel, refined	INCO Europe Ltd. (INCO Ltd., Canada)	Clydach, Wales	30
Petroleum, crude million 42-gallon barrels per day	Amoco Ltd., British Petroleum Ltd., Chevron Ltd., Esso (U.K.) Ltd., Occidental Petroleum Co. Ltd., Shell (U.K.) Ltd., Texaco, Inc., and Unocal, Inc.	North Sea oilfields	2.1
Petroleum, refined do.	British Petroleum Ltd., Conoco Ltd., Mobil Oil Co. Ltd., and others	11 refineries in various locations	2.3
Platinum-group metals	Johnson Matthey Plc.	Refineries at Enfield (London) and Royston	20
Potash	Cleveland Potash Ltd.	Boulby Mine, Yorkshire	500
Salt, rock	Imperial Chemical Industries Plc.	Mines at Winsford, Cheshire	3,000
Do.	Irish Salt Mining and Exploration Co.	Mine at Carrick Fergus, Northern Ireland	300
Sand and gravel	TMC Pioneer Aggregates Ltd.	Chelmsford, Essex	1,000
Silica, sand	Hepworth Minerals and Chemicals Ltd.	Operations in Cambridgeshire, Cheshire, Humberside, and Norfolk	6,000
Slate, natural	Alfred McAlpine Slate Ltd.	Penrhyn quarry, Bethesda, Wales	25
Steel	Corus Group	4 intergrated steelworks in Cleveland, Gwent, Humberside, and Lanark	18,000
Talc	Alex Sandison and Son Ltd.	Unst, Shetland Islands	15
Do.	Shetland Talc Ltd. (Anglo European Minerals Ltd., 50%; Dalriada Mineral Ventures Ltd., 50%)	Cunningsburg, Shetland Islands	35
Tin, ore	Baseresult Ltd.	South Crofty Mine, Cornwall (closed March 1998)	1,800
Titanium, sponge	Deeside Titanium Ltd.	Plant at Deeside, Clyde	5
Zinc, smelter	MIM Holdings (U.K.) Ltd.	Avonmouth, Avon	120

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